1112 Manatee Ave. West
Bradenton, FL 34205
purchasing@mymanatee.org

Solicitation Addendum

Addendum No.:	2
Solicitation No.:	19-TA003162CD
Project No.:	6086960 and 6045662
Solicitation Title:	44th Avenue East Extension Project- from 45th Street East to I-75
Addendum Date:	October 25, 2019
Procurement Contact:	Chris Daley, CPPO, CPPB- Procurement Manager

IFBC No. 19-TA003162CD is amended as set forth herein. Responses to questions posed by prospective bidders are provided below. This addendum is hereby incorporated in and made a part of IFBC No. 19-TA003162CD.

Delete:
APPENDIX A, MINIMUM QUALIFICATIONS, ITEM 5:
Delete item 5 from Appendix 5, Minimum Qualifications.

~~5. Bidder or Bidder's subcontractor has provided bridge construction services for at least three (3) clients since September 30, 2014 in which each project included bridge construction over a body of water opening of 1,000 feet or more.~~

~~**Provide the following information for the three (3) qualifying clients.**~~
~~**a) Name of client**~~
~~**b) Location (City/State)**~~
~~**c) Client contact name**~~
~~**d) Contact phone**~~
~~**e) Contact email**~~
~~**f) Service dates (Start/End)**~~

Add:
APPENDIX J, BID PRICING FORM, REVISED BID PRICING FORM PAGES APPENDIX J-1 THROUGH J-20

Add Revised Bid Pricing form pages Appendix J-1 through J-20 that are issued with this Addendum 2 to Appendix J.

Replace:
ELECTRONIC BID PRICING FORM

Replace Electronic Bid Pricing Form with the Revised Electronic Bid Pricing Form issued with this Addendum 2.

Replace:
BID ATATCHMENT 3, UTILITY TECHNICAL SPECIFICATIONS

Replace Bid Attachment 3- Utility Specifications, with the Revised Bid Attachment 3- Utility Specifications issued with this Addendum2.

Replace:
BID ATTACHMENT 7, POTABLE, SANITARY, AND RECLAIMED WATER UTILITY PLANS- 45TH STREET EAST TO 44TH AVE PLAZA EAST, PLAN SHEET NUMBERS U-74 THROUGH U87.

Replace Bid Attachment 7 Plan Sheet numbers U-74 through U-87 with the revised Plan Sheet Numbers U-74 through U-87A issued with this Addendum 2.

Replace:
BID ATTACHMENT 7, POTABLE, SANITARY, AND RECLAIMED WATER UTILITY PLANS- 45TH STREET EAST TO 44TH AVE PLAZA EAST, PLAN SHEET NUMBERS ULS-9 AND ULS-11.

Replace Bid Attachment 7 Plan Sheet numbers ULS-9 and ULS-11 with the revised Plan Sheet Numbers ULS-9 and ULS-11 issued with this Addendum 2.

Add:
BID ATTACHMENT 7, POTABLE, SANITARY, AND RECLAIMED WATER UTILITY PLANS- 45TH STREET EAST TO 44TH AVE PLAZA EAST, PLAN SHEET NUMBER U-02 NOTE 6.

Add the following to Bid Attachment 7, Plan Sheet number U-02 Note 6: Valves for new 30-inch and 36-inch water mains shall remain butterfly valves. Valves for new force mains shall remain gate valves.

Change to:
BID ATTACHMENT 7, POTABLE, SANITARY, AND RECLAIMED WATER UTILITY PLANS- 45TH STREET EAST TO 44TH AVE PLAZA EAST, PLAN SHEET NUMBER ULS-10, JUNCION BOX BILL OF MATERIALS ITEM 1- ENCLOSURE.

Item 1 Enclosure Manufacturer Part # changed to**:** Schaeffer's SPN4SS-14168-587

Replace:
BID ATTACHMENT 12, ROADWAY PLANS-44TH AVENUE PLAZA EAST TO I-75, PLAN SHEET NUMBERS 1, 2, 3, 12, 13, 31, 32, 34, 35, and 41.

Replace Bid Attachment 12 Plan Sheet numbers 1, 2, 3, 12, 13, 31, 32, 34, 35, and 41 with the revised Plan Sheet Numbers 1, 2, 3, 12, 13, 31, 32, 34, 35, and 41 issued with this Addendum 2.

Add:
The following items are issued with this Addendum 2 for informational purposes only:

1. Transmission Main Record Drawings- June 1969
2. Price Brothers PCCP Pipe laying Schedule 217.65
3. Price Brothers PCCP Abbreviations

Clarifications of Engineer's Changes:

Bid Attachment 7, Utility Plan Sheets:

Plan Sheets U74 through U87A- Replaced standard details with the most recent utility standard details

Plan Sheets ULS-9 and ULS-11- revised electrical details.

Bid Attachment 12, Roadway Plan Sheets: updated to reflect quantity changes in drainage structures

Utility Technical Specifications- Added Manatee County Approved Products list and made changes to match Utility Standards dated 2019, that are provided with track changes.

QUESTIONS AND RESPONSES:

Q1. On project 6045662 Plan Sheet L-5 Conduit Notes No. 1 requires the use of fusion couplers. Can E-locs be used in lieu of fusion couplings?

R1. No, the E-loc option is not approved as it is not in the standard specification as a conduit splicing option.

Q2. On project 6086960 Plan Sheet L-7, the legend shows that all light poles have arms (either 1 or 2); however sheet L-6 on the pole data there are no arm lengths shown. Please provide.

R2. See response issued to question 1 in Addendum No. 1.

Q3. The bid form for this project shows quantity of 187 pull boxes for pay item 635-2-12; the plans show 244. Will the bid form be updated to show 244 boxes?

R3. The bid form for this pay item has been updated with this Addendum 2.

Q4. Please provide type of end connection material needed for connection to existing 36-inch valve at the Elwood Booster Pump Station. Are the end connections flanged or mechanical joint?

R4. There is no connection to an existing butterfly valve at the Elwood Booster Pump Station. Assuming the reference is for the interconnection at Morgan Johnson Road and 40th Ave E on Sheet U-39, the Price Brothers laying schedule indicates that in-line valve included in the original design are flanged. However, this valve was not part of the original design and was "cut in" along with a 36"x36" tee after the pipeline was installed (refer to Sheet 21a of the Manatee County record drawings Russel & Axon, Water Works Project Section V, Transmission Main Part "H"). Typically, a valve that is "cut in" would be a mechanical joint. However, since there is no documentation, the EOR cannot confirm the type of valve end connection present.

Q5. Reference bid form, Pay Item 18, PROTECTION OF EXISTING STRUCTURES – VIBRATION MONITORING, please provide a Measurement and Payment Item for this bid item or at least describe what structures are to receive vibration monitoring.

R5. A description is included in Bid Attachment 4 Geotechnical Report beginning on page 20. The only exception is in the second paragraph it will be the Contractor's personnel performing the vibration monitory instead of the County's. Additional description is also found in the Structures Plan Sheet No. B-26, note 5 under the Pile Installation Notes.

Q6. Reference bid form, Pay Item 312, UW-4A, 36" DIP/RJ, since this pipe will be on top of the new bridge, will the factory restrained joint pipe have to be Special Thickness Class 53 as specification Section 02615, page 66 of 153, par. 2.01, sub-par A requires? Normally, the Class 53 pipe is for flanged pipe for above ground applications.

R6. The above ground pipe on the bridge shall be Pressure Class 350.

Q7. Reference specifications Section 02617, INSTALLATION AND TESTING OF PRESSURE PIPE, page 71 of 153, par 1.01, sub-par F, has a soils investigation for corrosive soils been conducted as this paragraph indicates? If so, we need to know if the results will require the large diameter ductile iron pipe be polyethylene wrapped as required in Specifications Section 02615, page 68 of 153. Par. 2.03, IDENTIFICATION, sub-par C, last sentence. If the test results will require the large diameter ductile iron pipe be polyethylene wrapped, will the large diameter pipe also have to be spiral wrapped with polyethylene as the first sentence of paragraph 'C' requires? Please clarify.

R7. Per Note 17 on Sheet U-02, all ductile iron pipe shall be poly wrapped. Spiral wrapping of the poly wrapped pipe is not required

Q8. Reference POTABLE, SANITARY, AND RECLAIMED WATER UTILITY WORK PLANS, sheet U-02, Note 17, this note answers the above question about polyethylene wrapping the pipe, but will we still have to spiral wrap the pipe prior to installing the polyethylene wrapping?

R8. See response to question six above.

Q9. Reference specifications Section 09900, PAINTING, page 149 of 153, par 3.14, RIVER CROSSING – PIPE AND SUPPORTS, sub-par. A., System No. 700-1: Zinc/Epoxy/Fluoropolymer (New steel or Ductile Iron Pipes), first paragraph, second to the last sentence, will the Owner require a gloss finish or a semi-gloss finish?

R9. The piping on the bridge shall have a gloss finish.

Q10. Reference plans for Project No. 6045662, sheet 12, structure S-115 on this sheet is shown as a J-5 Inlet, plan sheet 28 shows this structure as a P-5 Inlet, what is it supposed to be?

R10. The bid form and Summary of Drainage Structures sheet have been updated to show a P-5 inlet.

Q11. Reference bid form, pay item 46, quantity column for 44th Ave. Plaza E. to I-75, bid form shows 26, plans show 24 and this quantity includes structure S-115, please clarify.

R11. The bid form has been updated to show 24 EA.

Q12. Reference plans for Project No. 6045662, plan sheet 13, SUMMARY OF DRAINAGE STRUCTURES, Curb Inlets, J-5, <10', the total shows 4-each, bid form shows 3-each, please clarify.

R12. The bid form and Summary of Drainage Structures sheet have been updated to show 3 EA.

Q13. Reference bid form, pay item 57, bid quantity for 44th Ave. Plaza East to I-75 shows zero quantity, plan sheet 13, SUMMARY OF DRAINAGE STRUCTURES (2 OF 2) shows 2-each, please review.

R13. The bid form has been updated to show 2 EA.

Q14. Reference bid form, pay item 72, bid quantity shows 67LF, plans show 141LF, please review.

R14. The bid form has been updated to show 141 LF.

Q15. Reference bid form, pay item 73, bid quantity for 44th Ave. Plaza East to I-75 shows 3,118LF, plan sheet 13, SUMMARY OF DRAINAGE STRUCTURES (2 OF 2) shows 2,722LF, please review.

R15. The bid form and Summary of Drainage Structures sheet have been updated to show 2,679 LF.

Q16. Reference bid form, pay item 74, bid quantity for 44th Ave. Plaza East to I-75 shows 355LF, plan sheet 13, SUMMARY OF DRAINAGE STRUCTURES (2 OF 2) shows 593LF, please review.

R16. The bid form and Summary of Drainage Structures sheet have been updated to show 636 LF.

Q17. Reference bid form, pay item 75, bid quantity for 44th Ave. Plaza East to I-75 shows -0-LF, plan sheet 13, SUMMARY OF DRAINAGE STRUCTURES (2 OF 2) shows 99LF, please review.

R17. The bid form and Summary of Drainage Structures sheet have been updated to show 99 LF.

Q18. Reference bid form, pay item 76, bid quantity for 44th Ave. Plaza East to I-75 shows 322LF, plan sheet 13, SUMMARY OF DRAINAGE STRUCTURES (2 OF 2) shows 359LF, please review.

R18. The bid form and Summary of Drainage Structures sheet have been updated to show 360 LF.

Q19. Reference bid form, pay item 81, bid quantity for 44th Ave. Plaza East to I-75 shows 82LF, plan sheet 13, SUMMARY OF DRAINAGE STRUCTURES (2 OF 2) shows 8LF, please review.

R19. The bid form has been updated to show 8 LF

Q20. Reference bid form, pay item 87, bid quantity for 44th Ave. Plaza East to I-75 shows -0-EA, plan sheet 13, SUMMARY OF DRAINAGE STRUCTURES (2 OF 2) shows 1EA, please review.

R20. The bid form has been updated to show 1 EA.

Q21. Reference bid form, pay item 88, bid quantity for 44th Ave. Plaza East to I-75 shows 3EA, plan sheet 13, SUMMARY OF DRAINAGE STRUCTURES (2 OF 2) shows 2EA, please review.

R21. The bid form has been updated to show 2 EA.

Q22. Please clarify pay item UWW-11 (412) Cap 8" Force Main @ Caruso Road. The measurement & payment says it is to include the 8" line stop and restraining 3 joints of existing pipe. Yet there are separate pay items for the line stop and restraining of existing joints. Are we to include the line stop and joint restraints in item 412 or are they paid for in their respective pay items?

R22. Bid Item UWW-11 Cap 8-inch Force Main at Old Caruso Road includes the line stop and restraining 3 joints of existing pipe. For Bid Item UWW-16A Restrain Existing 8-inch Pipe Joints, refer to Note 2 on Sheet U-27. There is no separate pay item for wastewater line stops.

Q23. The measurement and payment section Bid Item #UW-14 "Reconnect Water Services for King Property" states that an allowance of $20,000 is provided however, the bid schedule does not have this allowance listed. Are all contractors to include the $20,000 in this bid item or will a new bid schedule be provided including this allowance?

R23. The bid form has been updated to reflect the allowance for bid item UW-14.

NOTE: Items that are ~~struck through~~ are deleted. Items that are underlined have been added or changed. All other terms and conditions remain as stated in the IFBC.

End of Addendum

INSTRUCTIONS:
Receipt of this addendum must be acknowledged as instructed in the solicitation document. Failure to acknowledge receipt of this Addendum may result in the response being deemed non-responsive.

AUTHORIZED FOR RELEASE Chris Daley

Chris Daley, CPPO, CPPB

Digitally signed by Chris Daley, CPPO, CPPB
DN: cn=Chris Daley, CPPO, CPPB, o=manatee County Government, ou=Procurement Manager, email=chris.daley@mymanatee.org, c=US
Date: 2019.10.25 13:19:12 -04'00'

BID FORM

(Submit in Triplicate)

44th Avenue East Extension Project - from 45th Street East to I-75

Based on Completion Time of 900 Calendar Days

PAY ITEM NO.	FDOT ITEM NUMBER	DESCRIPTION	44th Ave. East- Braden River Segment QTY.	44th Ave. East- 44th Ave. Plaza East to I-75 QTY	TOTAL PROJECT QTY.	UNITS	BID PRICE PER UNIT ($)	TOTAL BID PRICE ($)
		ROADWAY & BRIDGE						
1.	0101 1	Mobilization (Includes both projects)			1.00	LS		
2.	0102 1	Maintenance of Traffic (MOT), (Includes both Projects)			1.00	LS		
3.	0102 60	WORK ZONE SIGN	335.00		335.00	ED		
4.	0102 74 1	CHANNELIZING DEVICE- TYPES I, II, DI, VP, DRUM, OR LCD	744.00		744.00	ED		
5.	0102 74 2	CHANNELIZING DEVICE, TYPE III, 6'	203.00		203.00	ED		
6.	0102 76	ARROW BOARD / ADVANCE WARNING ARROW PANEL	400.00		400.00	ED		
7.	0102 78	TEMPORARY RETROREFLECTIVE PAVEMENT MARKER	961.00		961.00	EA		
8.	0102 99	PORTABLE CHANGEABLE MESSAGE SIGN, TEMPORARY	1,800.00		1,800.00	ED		
9.	0102107 1	TEMPORARY TRAFFIC DETECTION AND MAINTENANCE, INTERSECTION	200.00		200.00	ED		
10.	0103 1	TEMPORARY WORK STRUCTURE	1.00		1.00	LS		
11.	0104 10 3	SEDIMENT BARRIER	25,889.00	8,177.00	34,066.00	LF		
12.	0104 11	FLOATING TURBIDITY BARRIER	444.00		444.00	LF		
13.	0104 12	STAKED TURBIDITY BARRIER- NYLON REINFORCED PVC	76.00		76.00	LF		
14.	0104-15	SOIL TRACKING PREVENTION DEVICE		2.00	2.00	EA		
15.	0104 18	INLET PROTECTION SYSTEM	120.00	51.00	171.00	EA		
16.	0107 1	LITTER REMOVAL	17.80	5.28	23.08	AC		
17.	0107 2	MOWING	9.34	5.28	14.62	AC		
18.	0108 2	PROTECTION OF EXISTING STRUCTURES- VIBRATION MONITORING	1.00		1.00	LS		
19.	0110 1 1	CLEARING & GRUBBING	40.10	11.12	51.22	AC		
20.	0110 4 10	REMOVAL OF EXISTING CONCRETE	4,041.00		4,041.00	SY		
21.	0110 5	PLUGGING WATER WELLS, ARTESIAN	1.00		1.00	EA		
22.	0110 6	PLUGGING WATER WELLS, NON-ARTESIAN	1.00		1.00	EA		
23.	0120 1	REGULAR EXCAVATION	81,736.00	16,678.00	98,414.00	CY		
24.	0120 4	SUBSOIL EXCAVATION	1,851.00		1,851.00	CY		

Bidder Name: _____

Authorized Signature: _____

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25.	0120 6	EMBANKMENT	68,998.00	3,707.00	72,705.00	CY		
26.	0160 4	TYPE B STABILIZATION	101,690.00	23,500.00	125,190.00	SY		
27.	0285701	OPTIONAL BASE, BASE GROUP 01	10,354.00		10,354.00	SY		
28.	0285709	OPTIONAL BASE, BASE GROUP 09	70,797.00	20,874.00	91,671.00	SY		
29.	0327 70 5	MILLING EXIST ASPH PAVT, 2" AVG DEPTH	4,591.00		4,591.00	SY		
30.	0327-70-6	MILLING EXIST ASPH PAVT, 1 1/2" AVG DEPTH		15,664.00	15,664.00	SY		
31.	0334 1 12	SUPERPAVE ASPHALTIC CONC, TRAFFIC B	647.70		647.70	TN		
32.	0334 1 13	SUPERPAVE ASPHALTIC CONC, TRAFFIC C	10,641.00	4,737.00	15,378.00	TN		
33.	0337 7 83	ASPHALT CONCRETE FRICTION COURSE,Traffic C, FC-12.5, PG 76-22, ARB	9,501.00	3,015.00	12,516.00	TN		
34.	0339 1	MISCELLANEOUS ASPHALT PAVEMENT	85.25		85.25	TN		
35.	0400 0 11	CONCRETE CLASS NS, GRAVITY WALL	58.00	75.00	133.00	CY		
36.	0400 1 2	CONCRETE CLASS I, ENDWALLS	8.00		8.00	CY		
37.	0400 2 2	CONCRETE CLASS II, ENDWALLS	12.50	0.33	12.83	CY		
38.	0400 2 4	CONC CLASS II, SUPERSTRUCTURE	4,851.20		4,851.20	CY		
39.	0400 2 10	CONCRETE CLASS II, APPROACH SLABS	248.60		248.60	CY		
40.	0400 4 5	CONCRETE CLASS IV, SUBSTRUCTURE	920.50		920.50	CY		
41.	0400 9	BRIDGE DECK GROOVING & PLANING, DECK 8.5"&>	13,368.90		13,368.90	SY		
42.	0400147	COMPOSITE NEOPRENE PADS	142.40		142.40	CF		
43.	0415 1 4	REINFORCING STEEL - SUPERSTRUCTURE	1,268,424.00		1,268,424.00	LB		
44.	0415 1 5	REINFORCING STEEL- SUBSTRUCTURE	220,858.00		220,858.00	LB		
45.	0415 1 9	REINFORCING STEEL- APPROACH SLABS	47,262.00		47,262.00	LB		
46.	0425 1351	INLETS, CURB, TYPE P-5, <10'	19.00	24.00	43.00	EA		
47.	0425 1352	INLETS, CURB, TYPE P-5, >10'	2.00		2.00	EA		
48.	0425-1-355	INLETS, CURB, TYPE P-5, PARTIAL		2.00	2.00	EA		
49.	0425 1361	INLETS, CURB, TYPE P-6, <10'	18.00	2.00	20.00	EA		
50.	0425-1-365	INLETS, CURB, TYPE P-6, PARTIAL		4.00	4.00	EA		
51.	0425 1451	INLETS, CURB, TYPE J-5, <10'	11.00	3.00	14.00	EA		
52.	0425 1452	INLETS, CURB, TYPE J-5, >10'	9.00		9.00	EA		

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53.	0425 1461	INLETS, CURB, TYPE J-6, <10'	9.00	3.00	12.00	EA		
54.	0425 1462	INLETS, CURB, TYPE J-6, >10'	2.00		2.00	EA		
55.	0425-1-529	INLETS, DT BOT, TYPE C, MODIFY		1.00	1.00	EA		
56.	0425 1531	INLETS, DITCH BOTTOM, TYPE C MODIFIED- BACK OF SIDEWALK, <10'	20.00		20.00	EA		
57.	0425 1541	INLETS, DT BOT, TYPE D, <10'	3.00		3.00	EA		
58.	0425-1-549	INLETS, DT BOT, TYPE D, MODIFY		2.00	2.00	EA		
59.	0425 1551	INLETS, DT BOT, TYPE E, <10'	3.00		3.00	EA		
60.	0425 1581	INLETS, DT BOT, TYPE H, <10'	2.00		2.00	EA		
61.	0425 1891	INLETS, BARRIER WALL, <10'	5.00		5.00	EA		
62.	0425 1910	INLETS, CLOSED FLUME	4.00		4.00	EA		
63.	0425 2 41	MANHOLES, P-7, <10'	6.00		6.00	EA		
64.	0425-2-61	MANHOLES, P-8, < 10'		2.00	2.00	EA		
65.	0425-2-63	MANHOLES, P-8, PARTIAL		1.00	1.00	EA		
66.	0425 2 71	MANHOLES, J-7, <10'	9.00		9.00	EA		
67.	0425 2 72	MANHOLES, J-7, >10'	5.00		5.00	EA		
68.	0425-2-91	MANHOLES, J-8, < 10'		2.00	2.00	EA		
69.	0430174115	PIPE CULVERT, OPTIONAL MATERIAL, ROUND, 15"SD	63.00		63.00	LF		
70.	0430174218	PIPE CULVERT, OPTIONAL MATERIAL, OTHER SHAPE - ELLIP/ARCH, 18"SD	68.00		68.00	LF		
71.	0430175112	PIPE CULVERT,OPTIONAL MATERIAL,ROUND, 12"S/CD	53.00		53.00	LF		
72.	0430-175-115	PIPE CULVERT, OPTIONAL MATERIAL, ROUND, 15" S/CD		141.00	141.00	LF		
73.	0430175118	PIPE CULVERT,OPTIONAL MATERIAL,ROUND, 18"S/CD	4,228.00	2,679.00	6,907.00	LF		
74.	0430175124	PIPE CULVERT,OPTIONAL MATERIAL,ROUND, 24"S/CD	2,223.00	636.00	2,859.00	LF		
75.	0430175130	PIPE CULVERT, OPT MATERIAL, ROUND, 30"S/CD	716.00	99.00	815.00	LF		
76.	0430175136	PIPE CULVERT, OPT MATERIAL, ROUND, 36"S/CD	1,329.00	360.00	1,689.00	LF		
77.	0430175142	PIPE CULVERT, OPT MATERIAL, ROUND, 42"S/CD	695.00		695.00	LF		
78.	0430175148	PIPE CULVERT, OPT MATERIAL, ROUND, 48"S/CD	1,234.00		1,234.00	LF		
79.	0430175154	PIPE CULVERT, OPT MATERIAL, ROUND, 54"S/CD	3,056.00		3,056.00	LF		

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80.	0430175160	PIPE CULVERT, OPT MATERIAL, ROUND, 60"S/CD	1,516.00		1,516.00	LF		
81.	0430175218	PIPE CULVERT,OPTIONAL MATERIAL,OTHER-ELIP/ARCH, 18"S/CD	226.00	8.00	234.00	LF		
82.	0430175224	PIPE CULVERT,OPTIONAL MATERIAL,OTHER SHAPE-ELIP/ARCH, 24"S/CD	277.00	4.00	281.00	LF		
83.	0430175230	PIPE CULVERT, OPT MATERIAL, OTHER SHAPE - ELIP/ARCH, 30"S/CD	79.00		79.00	LF		
84.	0430175242	PIPE CULVERT, OPT MATERIAL, OTHER SHAPE - ELIP/ARCH, 42"S/CD	198.00		198.00	LF		
85.	0430175254	PIPE CULVERT, OPT MATERIAL, OTHER SHAPE - ELIP/ARCH, 54"S/CD	36.00		36.00	LF		
86.	0430982123	MITERED END SECTION, OPTIONAL ROUND, 15" CD		1.00	1.00	EA		
87.	0430982125	MITERED END SECTION, OPTIONAL ROUND, 18" CD	2.00	1.00	3.00	EA		
88.	0430982129	MITERED END SECTION, OPTIONAL ROUND, 24" CD	3.00	2.00	5.00	EA		
89.	0430-982-133	MITERED END SECTION, OPTIONAL ROUND, 30" CD		1.00	1.00	EA		
90.	0430-982-138	MITERED END SECTION, OPTIONAL ROUND, 36" CD		1.00	1.00	EA		
91.	0430982142	MITERED END SECTION, OPTIONAL ROUND, 54" CD	2.00		2.00	EA		
92.	0430982143	MITERED END SECTION, OPTIONAL ROUND, 60" CD	1.00		1.00	EA		
93.	0430982625	MITERED END SECTION, OPTIONAL - ELLIPTICAL / ARCH, 18" CD	2.00		2.00	EA		
94.	0430982629	MITERED END SECTION, OPTIONAL - ELLIPTICAL / ARCH, 24" CD	1.00		1.00	EA		
95.	0430984123	MITERED END SECTION, OPTIONAL ROUND, 15" SD	6.00		6.00	EA		
96.	0430984625	MITERED END SECT, OPTIONAL - ELLIPTICAL / ARCH, 18" SD	4.00		4.00	EA		
97.	0450 2 45	PREST BEAMS: FLORIDA-I BEAM 45"	14,937.90		14,937.90	LF		
98.	0455 34 5	PRESTRESSED CONCRETE PILING, 24" SQ	13,278.90		13,278.90	LF		
99.	0455143 5	TEST PILES-PRESTRESSED CONCRETE,24" SQ	1,217.00		1,217.00	LF		
100.	0458 1 11	BRIDGE DECK EXPANSION JOINT, NEW CONSTRUCTION, F&I POURED JOINT WITH BACKER ROD	689.00		689.00	LF		
101.	0459 71	PILES, POLYETHYLENE SHEETING	59.40		59.40	SY		
102.	0515-1-1	PIPE HANDRAIL - GUIDERAIL, STEEL		550.00	550.00	LF		
103.	0515 1 2	PIPE HANDRAIL - GUIDERAIL, ALUMINUM	1,068.00		1,068.00	LF		

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BID FORM

(Submit in Triplicate)

44th Avenue East Extension Project - from 45th Street East to I-75

Based on Completion Time of 900 Calendar Days

PAY ITEM NO.	FDOT ITEM NUMBER	DESCRIPTION	44th Ave. East- Braden River Segment QTY.	44th Ave. East- 44th Ave. Plaza East to I-75 QTY	TOTAL PROJECT QTY.	UNITS	BID PRICE PER UNIT ($)	TOTAL BID PRICE ($)
104.	0515 42	PEDESTRIAN/BICYCLE RAILING, ALUMINUM, DOUBLE BULLET RAIL	3,124.80		3,124.80	LF		
105.	0519-78	BOLLARDS	4.00		4.00	EA		
106.	0520 1 10	CONCRETE CURB & GUTTER, TYPE F	16,912.00	4,145.00	21,057.00	LF		
107.	0520 1 11	CONCRETE CURB & GUTTER, VARIABLE HEIGHT TYPE F	7,681.00		7,681.00	LF		
108.	0520-2-2	CONCRETE CURB & GUTTER, TYPE AB		8,515.00	8,515.00	LF		
109.	0520 5 11	TRAFFIC SEPARATOR CONCRETE-TYPE I, 4' WIDE	1,386.00		1,386.00	LF		
110.	0520 5 16	TRAFFIC SEPARATOR CONCRETE- TYPE I, 8.5' WIDE	1,401.00		1,401.00	LF		
111.	0521 1	MEDIAN CONCRETE BARRIER WALL	3,557.00		3,557.00	LF		
112.	0521 5 1	CONCRETE TRAFFIC RAILING, BRIDGE 32" F - SHAPE	6,249.70		6,249.70	LF		
113.	0521 6 11	CONCRETE PARAPET, PEDESTRIAN/BICYCLE, 27" HEIGHT	3,124.80		3,124.80	LF		
114.	0521 72 5	SHOULDER CONCRETE BARRIER WALL, RIGID-CURB & GUTTER	3,720.00		3,720.00	LF		
115.	0522 1	CONCRETE SIDEWALK AND DRIVEWAYS, 4" THICK	5,901.00	4,484.00	10,385.00	SY		
116.	0522 2	CONCRETE SIDEWALK AND DRIVEWAYS, 6" THICK	2,849.00		2,849.00	SY		
117.	0527 2	DETECTABLE WARNINGS	495.00	379.00	874.00	SF		
118.	0530 1	RIPRAP, SAND-CEMENT	55.00		55.00	CY		
119.	0530 3 3	RIPRAP- RUBBLE, BANK AND SHORE	1,558.00		1,558.00	TN		
120.	0530-74	BEDDING STONE	1,440.00		1,440.00	TN		
121.	0536 1 0	GUARDRAIL -ROADWAY, GENERAL/LOW SPEED TL-2	366.80		366.80	LF		
122.	0536 85 24	GUARDRAIL END ANCHORAGE ASSEMBLY- PARALLEL	1.00		1.00	EA		
123.	0536 85 26	GUARDRAIL END ANCHORAGE ASSEMBLY- TYPE CRT	1.00		1.00	EA		
124.	0542-70	BUMPER GUARDS, CONCRETE	11.00		11.00	EA		
125.	0550-10-222	FENCING, TYPE B, 5.1-6.0, W/ VINYL COATING	700.00		700.00	LF		
126.	0570 1 1	PERFORMANCE TURF	26,152.00		26,152.00	SY		
127.	0570 1 2	PERFORMANCE TURF, SOD	19,369.00	18,550.00	37,919.00	SY		
128.	0710 11101	PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, SOLID, 6"	3.34	3.11	6.45	GM		

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44th Avenue East Extension Project - from 45th Street East to I-75

Based on Completion Time of 900 Calendar Days

PAY ITEM NO.	FDOT ITEM NUMBER	DESCRIPTION	44th Ave. East- Braden River Segment QTY.	44th Ave. East- 44th Ave. Plaza East to I-75 QTY	TOTAL PROJECT QTY.	UNITS	BID PRICE PER UNIT ($)	TOTAL BID PRICE ($)
129.	0710 11124	PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, SOLID FOR DIAGONAL OR CHEVRON, 18"	97.80		97.80	LF		
130.	0710 11125	PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, SOLID FOR STOP LINE OR CROSSWALK, 24"	528.10	183.00	711.10	LF		
131.	0710 11131	PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, SKIP, 10-30 OR 3-9 SKIP, 6" WIDE	52.79		52.79	GM		
132.	0710 11160	PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, MESSAGE OR SYMBOL	2.00		2.00	EA		
133.	0710 11201	PAINTED PAVEMENT MARKINGS, STANDARD, YELLOW, SOLID, 6"	55.40	2.947	58.347	GM		
134.	0710 11224	PAINTED PAVEMENT MARKINGS, STANDARD, YELLOW, SOLID FOR DIAGONAL OR CHEVRON, 18"	680.20		680.20	LF		
		SUBTOTAL (ROADWAY & BRIDGE ONLY)						
		CONTRACT CONTINGENCY WORK FOR ROADWAY & BRIDGE (USED ONLY WITH COUNTY APPROVAL)					**10%**	
		SIGNING AND PAVEMENT MARKING						
135.	0654 2 21	RECTANGULAR RAPID FLASHING BEACON, F&I- SOLAR POWERED, COMPLETE SIGN ASSEMBLY- SINGLE DIRECTION		2.00	2.00	AS		
136.	0654 2 22	RECTANGULAR RAPID FLASHING BEACON, FURNISH & INSTALL- SOLAR POWERED, COMPLETE ASSEMBLY- BACK TO BACK	2.00	1.00	3.00	AS		
137.	0700 1 11	SINGLE POST SIGN, F&I GROUND MOUNT, UP TO 12 SF	58.00	26.00	84.00	AS		
138.	0700 1 12	SINGLE POST SIGN, F&I GROUND MOUNT, 12-20 SF	6.00	1.00	7.00	AS		
139.	0700 1 13	SINGLE POST SIGN, F&I GROUND MOUNT, 21-30 SF	1.00	5.00	6.00	AS		
140.	0700 1 50	SINGLE POST SIGN, RELOCATE	4.00	1.00	5.00	AS		
141.	0700 1 60	SINGLE POST SIGN, REMOVE	21.00		21.00	AS		
142.	0700-1-74	SINGLE POST SIGN, F&I CUSTOM, 31+ SF		1.00	1.00	AS		
143.	0700 2 12	MULTI- POST SIGN, F&I GROUND MOUNT, 12-20 SF	1.00		1.00	AS		
144.	0700 2 13	MULTI- POST SIGN, F&I GROUND MOUNT, 21-30 SF	1.00		1.00	AS		
145.	0700 2 14	MULTI- POST SIGN, F&I GROUND MOUNT, 31-50 SF	2.00	2.00	4.00	AS		
146.	0700 3601	SIGN PANEL, REMOVE, UP TO 12 SF	3.00	2.00	5.00	EA		

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44th Avenue East Extension Project - from 45th Street East to I-75

Based on Completion Time of 900 Calendar Days

PAY ITEM NO.	FDOT ITEM NUMBER	DESCRIPTION	44th Ave. East-Braden River Segment QTY.	44th Ave. East- 44th Ave. Plaza East to I-75 QTY	TOTAL PROJECT QTY.	UNITS	BID PRICE PER UNIT ($)	TOTAL BID PRICE ($)
147.	0700 6 60	HIGHLIGHTED SIGN, REMOVE	3.00		3.00	AS		
148.	0705 10 1	OBJECT MARKER, TYPE 1	23.00	17.00	40.00	EA		
149.	0705 10 4	OBJECT MARKER, TYPE 4	6.00	3.00	9.00	EA		
150.	0705-11-1	DELINEATOR, FLEXIBLE TUBULAR, YELLOW - YELLOW		8.00	8.00	EA		
151.	0705 11 3	DELINEATOR, FLEXIBLE HIGH VISABILITY MEDIAN	14.00		14.00	EA		
152.	0706 3	RETRO-REFLECTIVE PAVEMENT MARKERS	1,159.00		1,159.00	EA		
153.	0710 11290	PAINTED PAVEMENT MARKINGS, STANDARD, YELLOW, ISLAND NOSE	111.00	124.00	235.00	SF		
154.	0710-90	PAINTED PAVEMENT MARKINGS, FINAL SURFACE		1.00	1.00	LS		
155.	0711 11123	THERMOPLASTIC, STANDARD, WHITE, SOLID, 12" FOR CROSSWALK AND ROUNDABOUT	1,606.00	1,436.00	3,042.00	LF		
156.	0711 11124	THERMOPLASTIC, STANDARD, WHITE, SOLID, 18" FOR DIAGONALS AND CHEVRONS	500.00		500.00	LF		
157.	0711 11125	THERMOPLASTIC, STANDARD, WHITE, SOLID, 24" FOR STOP LINE AND CROSSWALK	395.00	290.00	685.00	LF		
158.	0711 11141	THERMOPLASTIC, STANDARD, WHITE, 2-4 DOTTED GUIDELINE/ 6-10 GAP EXTENSION, 6"	0.616	0.502	1.118	GM		
159.	0711 11160	THERMOPLASTIC, STANDARD, WHITE, MESSAGE OR SYMBOL	2.00		2.00	EA		
160.	0711 11170	THERMOPLASTIC, STANDARD, WHITE, ARROW	74.00	25.00	99.00	EA		
161.	0711 11224	THERMOPLASTIC, STANDARD, YELLOW, SOLID, 18" FOR DIAGONAL OR CHEVRON	474.00	29.00	503.00	LF		
162.	0711 11241	THERMOPLASTIC, STANDARD, YELLOW, 2-4 DOTTED GUIDE LINE /6-10 DOTTED EXTENSION LINE, 6"	0.376	0.186	0.562	GM		
163.	0711 14125	THERMOPLASTIC, PREFORMED, WHITE, SOLID, 24" FOR CROSSWALK	520.00	526.00	1,046.00	LF		
164.	0711 14160	THERMOPLASTIC, PREFORMED, WHITE, MESSAGE	35.00	8.00	43.00	EA		
165.	0711 14170	THERMOPLASTIC, PREFORMED, WHITE, ARROWS	35.00	8.00	43.00	EA		
166.	0711 16101	THERMOPLASTIC, STANDARD-OTHER SURFACES, WHITE, SOLID, 6"	8.653	3.263	11.916	GM		
167.	0711 16102	THERMOPLASTIC, STANDARD-OTHER SURFACES, WHITE, SOLID, 8"	0.087		0.087	GM		
168.	0711 16131	THERMOPLASTIC, OTHER SURFACES, WHITE, SKIP, 6",10-30 SKIP OR 3-9 LANE DROP	2.687	1.772	4.459	GM		

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44th Avenue East Extension Project - from 45th Street East to I-75

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169.	0711 16201	THERMOPLASTIC, STANDARD-OTHER SURFACES, YELLOW, SOLID, 6"	4.168	1.831	5.999	GM		
170.	0711 17	THERMOPLASTIC, REMOVE EXISTING THERMOPLASTIC PAVEMENT MARKINGS	44.00		44.00	SF		
171.	0713103101	PERMANENT TAPE, WHITE, SOLID, 6" FOR CONCRETE BRIDGES	1.182		1.182	GM		
172.	0713103131	PERMENENT TAPE, WHITE, SKIP/DOTTED, 6" FOR CONCRETE SURFACES	0.591		0.591	GM		
173.	0713103201	PERMANENT TAPE, YELLOW, SOLID, 6" FOR CONCRETE BRIDGES	0.591		0.591	GM		
174.	0713103331	PERMANENT TAPE, BLACK, SKIP/DOTTED, 6" FOR CONCRETE SURFACES	0.591		0.591	GM		
SUBTOTAL (SIGNING & PAVEMENT MARKING ONLY)								
CONTRACT CONTINGENCY WORK FOR SIGNING & PAVEMENT MARKING (USED ONLY WITH COUNTY APPROVAL)							**10%**	
		SIGNALIZATION & LIGHTING						
175.	0630 2 11	CONDUIT, FURNISH & INSTALL, OPEN TRENCH	23,394.00	11,611.00	35,005.00	LF		
176.	0630 2 12	CONDUIT, FURNISH & INSTALL, DIRECTIONAL BORE	3,697.00	2,544.00	6,241.00	LF		
177.	0630-2-14	CONDUIT, FURNISH & INSTALL, ABOVE GROUND		30.00	30.00	LF		
178.	0632 7 1	SIGNAL CABLE- NEW OR RECONSTRUCTED INTERSECTION, FURNISH & INSTALL	2.00	1.00	3.00	PI		
179.	0633 1121	FIBER OPTIC CABLE, F&I, UNDERGROUND,2-12 FIBERS	210.00	220.00	430.00	LF		
180.	633 1 122	FIBER OPTIC CABLE, F&I, UNDERGROUND,13-48 FIBERS		3,994.00	3,994.00	LF		
181.	0633 1123	FIBER OPTIC CABLE, F&I, UNDERGROUND,49-96 FIBERS	10,926.00		10,926.00	LF		
182.	0633 2 31	FIBER OPTIC CONNECTION, INSTALL, SPLICE	56.00	8.00	64.00	EA		
183.	0633 3 11	FIBER OPTIC CONNECTION HARDWARE, F&I, SPLICE ENCLOSURE	4.00	2.00	6.00	EA		
184.	0633 3 12	FIBER OPTIC CONNECTION HARDWARE, F&I, SPLICE TRAY	7.00	2.00	9.00	EA		
185.	0633 3 13	FIBER OPTIC CONNECTION HARDWARE, F&I, PRETERMINATED CONNECTOR ASSEMBLY	36.00		36.00	EA		
186.	633 3 15	FIBER OPTIC CONNECTION HARDWARE, F&I, PRETERMINATED PATCH PANEL		2.00	2.00	EA		

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44th Avenue East Extension Project - from 45th Street East to I-75

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187.	0633 3 16	FIBER OPTIC CONNECTION HARDWARE, F&I, PATCH PANEL- FIELD TERMINATED	3.00		3.00	EA		
188.	0633 3 17	FIBER OPTIC CONNECTION HARDWARE, F&I, CONNECTOR PANEL	3.00		3.00	EA		
189.	0633 3 51	FIBER OPTIC CONNECTION HARDWARE, ADJUST/MODIFY SPLICE ENCLOSURE	1.00		1.00	EA		
190.	0633 3 52	FIBER OPTIC CONNECTION HARDWARE, ADJUST/MODIFY SPLICE TRAY	1.00		1.00	EA		
191.	0633 8 1	MULTI-CONDUCTOR COMMUNICATION CABLE, FURNISH & INSTALL	414.00	460.00	874.00	LF		
192.	0634-4600	SPAN WIRE ASSEMBLY, REMOVE- POLES REMAIN	1.00		1.00	PI		
193.	0635 2 11	PULL & SPLICE BOX, F&I, 13" x 24" COVER SIZE	172.00	72.00	244.00	EA		
194.	0635 2 12	PULL & SPLICE BOX, F&I, 24" X 36" COVER SIZE	13.00	60.00	73.00	EA		
195.	0635 2 13	PULL & SPLICE BOX, F&I, 30" X 60" RECTANGULAR OR 36" ROUND COVER SIZE	5.00	2.00	7.00	EA		
196.	0639 1122	ELECTRICAL POWER SERVICE, F&I, UNDERGROUND, METER PURCHASED BY CONTRACTOR	3.00	1.00	4.00	AS		
197.	0639 2 1	ELECTRICAL SERVICE WIRE	980.00	807.00	1,787.00	LF		
198.	0639 3 11	ELECTRICAL SERVICE DISCONNECT, F&I, POLE MOUNT	5.00	1.00	6.00	EA		
199.	639 4 6	EMERGENCY GENERATOR- PORTABLE, INSTALL HOUSING ONLY		1.00	1.00	EA		
200.	0641 2 12	PRESTRESSED CONCRETE POLE, F&I, TYPE P-II SERVICE POLE	4.00	1.00	5.00	EA		
201.	0641 2 13	PRESTRESSED CONCRETE POLE, F&I, TYPE P-III	4.00	1.00	5.00	EA		
202.	0646 1 11	ALUMINUM SIGNALS POLE, PEDESTAL	12.00	6.00	18.00	EA		
203.	649 21 6	STEEL MAST ARM ASSEMBLY, FURNISH AND INSTALL, SINGLE ARM 50		3.00	3.00	EA		
204.	0649 31207	MAST ARM,F&I, WIND SPEED-130,SINGLE ARM,W/0 LUMINAIRE-46	1.00		1.00	EA		
205.	0649 31203	MAST ARM,F&I, WIND SPEED-130,SINGLE ARM,W/0 LUMINAIRE-60	1.00		1.00	EA		
206.	0649 31204	MAST ARM,F&I, WIND SPEED-130,SINGLE ARM,W/0 LUMINAIRE, ARM LENGTH 70.5	1.00		1.00	EA		
207.	0649 31205	MAST ARM,F&I, WIND SPEED-130,SINGLE ARM,W/0 LUMINAIRE, ARM LENGTH 78	1.00		1.00	EA		

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44th Avenue East Extension Project - from 45th Street East to I-75

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208.	0650 1 14	TRAFFIC SIGNAL, FURNISH & INSTALL ALUMINUM, 3 SECTION, 1 WAY	9.00	6.00	15.00	AS		
209.	0650 1 16	TRAFFIC SIGNAL, FURNISH & INSTALL ALUMINUM, 4 SECTION, 1 WAY	5.00	2.00	7.00	AS		
210.	0650 1 19	TRAFFIC SIGNAL, FURNISH & INSTALL ALUMINUM, 5 SECTION CLUSTER, 1 WAY	5.00		5.00	AS		
211.	0650 1 60	TRAFFIC SIGNAL, REMOVE- POLES TO REMAIN	3.00		3.00	AS		
212.	0650 1 70	TRAFFIC SIGNAL, RELOCATE	2.00		2.00	AS		
213.	0653 1 11	COUNTDOWN, 1 WAY	12.00	6.00	18.00	AS		
214.	0660 3 11	VEHICLE DETECTION SYSTEM- MICROWAVE, FURNISH & INSTALL CABINET EQUIPMENT	4.00	2.00	6.00	EA		
215.	0660 3 12	VEHICLE DETECTION SYSTEM- MICROWAVE, FURNISH & INSTALL, ABOVE GROUND EQUIPMENT	6.00	4.00	10.00	EA		
216.	0660 4 11	VEHICLE DETECTION SYSTEM- VIDEO, FURNISH & INSTALL CABINET EQUIPMENT	1.00		1.00	EA		
217.	0660 4 12	VEHICLE DETECTION SYSTEM- VIDEO, FURNISH & INSTALL ABOVE GROUND EQUIPMENT	4.00		4.00	EA		
218.	0660 4 52	VEHICLE DETECTION SYSTEM- VIDEO, ADJUST/MODIFY ABOVE GROUND EQUIPMENT	1.00		1.00	EA		
219.	0660 6121	VEHICLE DETECTION SYSTEM- AVI, BLUETOOTH, FURNISH & INSTALL, CABINET EQUIPMENT	2.00	1.00	3.00	EA		
220.	0660 6122	VEHICLE DETECTION SYSTEM- AVI, BLUETOOTH, FURNISH & INSTALL, ABOVE GROUND EQUIPMENT	2.00	1.00	3.00	EA		
221.	0663 1 111	SIGNAL PRIORITY AND PREEMPTION SYSTEM, F&I, OPTICAL, CABINET ELECTRONICS		1.00	1.00	EA		
222.	0663 1 112	SIGNAL PRIORITY AND PREEMPTION SYSTEM, F&I, OPTICAL, DETECTOR		3.00	3.00	EA		
223.	0665 1 11	PEDESTRIAN DETECTOR, FURNISH & INSTALL, STANDARD	12.00	6.00	18.00	EA		
224.	0670 5112	TRAFFIC CONTROLLER ASSEMBLY, F&I, NEMA, 2 PREEMPTION	1.00	1.00	2.00	AS		
225.	0670 5400	TRAFFIC CONTROLLER ASSEMBLY, MODIFY	1.00		1.00	AS		
226.	0676 2122	ITS CABINET, FURNISH & INSTALL, POLE MOUNT WITH SUNSHIELD, 336S, 24" W X 46" H X 22" D	4.00	1.00	5.00	EA		
227.	0682 1113	ITS CCTV CAMERA, F&I, DOME PTZ ENCLOSURE - PRESSURIZED, IP, HIGH DEFINITION	4.00	1.00	5.00	EA		

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228.	0684 1 1	MANAGED FIELD ETHERNET SWITCH, FURNISH & INSTALL	3.00	2.00	5.00	EA		
229.	0684 2 1	DEVICE SERVER, FURNISH & INSTALL	2.00		2.00	EA		
230.	684 6 11	WIRELESS COMMUNICATION DEVICE, FURNISH & INSTALL ETHERNET ACCESS POINT		1.00	1.00	EA		
231.	684 6 12	WIRELESS COMMUNICATION DEVICE, FURNISH & INSTALL ETHERNET SUBSCRIBER UNIT		1.00	1.00	EA		
232.	685 1 11	UNINTERRUPTIBLE POWER SUPPLY, FURNISH AND INSTALL, LINE INTERACTIVE		1.00	1.00	EA		
233.	0685112	UNINTERRUPTIBLE POWER SOURCE (F&I) ONLINE/DOUBLE CONVERSION	4.00	1.00	5.00	EA		
234.	0685113	UNINTERRUPTIBLE POWER SOURCE (F&I) LINE INTERACTIVE WITH CABINET	1.00		1.00	EA		
235.	0700 3201	SIGN PANEL, FURNISH & INSTALL OVERHEAD MOUNT, UP TO 12 SF	2.00	2.00	4.00	EA		
236.	0700 5 22	INTERNALLY ILLUMINATED SIGN, FURNISH & INSTALL, OVERHEAD MOUNT, 12-18 SF	4.00	3.00	7.00	EA		
237.	0700 5 50	INTERNALLY ILLUMINATED SIGN, RELOCATE	1.00		1.00	EA		
238.	0715 1 12	LIGHTING CONDUCTORS, F&I, INSULATED, NO.8 - 6	90,954.00	34,727.00	125,681.00	LF		
239.	0715 1 13	LIGHTING CONDUCTORS, F&I, INSULATED, NO 4 TO NO 2	987.00	500.00	1,487.00	LF		
240.	0715-4-13	LIGHT POLE COMPLETE, FURNISH & INSTALL STANDARD POLE STANDARD FOUNDATION, 40' MOUNTING HEIGHT		22.00	22.00	EA		
241.	0715 4121	LIGHT POLE COMPLETE, F&I, WIND SPEED 130, POLE HEIGHT 40'	55.00		55.00	EA		
242.	0715-4-23	LIGHT POLE COMPLETE, FURNISH & INSTALL STANDARD POLE SPECIAL FOUNDATION, 40' MOUNTING HEIGHT		31.00	31.00	EA		
243.	0715 5 12	LUMINAIRE & BRACKET ARM, F&I, GALVANIZED STEEL	1.00		1.00	EA		
244.	0715 7 11	LOAD CENTER, F&I, SECONDARY VOLTAGE	2.00	1.00	3.00	EA		
245.	0715-11-111	LUMINAIRE, F&I, ROADWAY, COBRAHEAD		2.00	2.00	EA		
246.	0715500 1	POLE CABLE DISTRIBUTION SYSTEM, CONVENTIONAL	100.00	53.00	153.00	EA		
247.	0715500 3	POLE CABLE DISTRIBUTION SYSTEM, WALL MOUNT	20.00		20.00	EA		

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248.	0715512140	LIGHT POLE COMPLETE- SPECIAL DESIGN, F&I, DOUBLE ARM SHOULDER MOUNT, ALUMINUM, 40'	20.00		20.00	EA		
249.	0715515140	LIGHT POLE COMPLETE- SEPCIAL DESIGN, F&I, SINGLE ARM BRIDGE MOUNT, NON-STD ALUMINUM, 40'	20.00		20.00	EA		
SUBTOTAL (SIGNALIZATION & LIGHTING ONLY)								
CONTRACT CONTINGENCY WORK FOR SIGNALIZATION & LIGHT8ING (USED ONLY WITH COUNTY APPROVAL)							**10%**	
POTABLE WATER								
	GENERAL							
250.	UG1	UG-1 Unsuitable Material Excavation Below Grade	500.00		500.00	CY		
251.	UG2	UG-2 Select Backfill Below Grade	500.00		500.00	CY		
252.	UG3	UG-3 Crushed Stone Pipe Bedding	250.00		250.00	CY		
253.	UG4	UG-4 Permanent Roadway Restoration	500.00		500.00	SY		
254.	UG5	UG-5 Temporary Roadway Restoration	500.00		500.00	SY		
255.	UG6	UG-6 Patch Roadway Impacted by Pipe Restraint Installation	200.00		200.00	SY		
256.	UG7	UG-7 Asphalt Overlay	2,000.00		2,000.00	SY		
257.	UG8	UG-8 Driveway Restoration	100.00		100.00	SY		
258.	UG9	UG-9 Sod Restoration	1,500.00		1,500.00	SY		
259.	UG10	UG-10 Tree Replacement	16.00		16.00	EA		
	POTABLE WATER INSTALL							
		UW-1 Water Main by Open Cut						
260.		UW-1A 36" DIP PO	1,785.00		1,785.00	LF		
261.		UW-1B 36" DIP RJ	2,685.00		2,685.00	LF		
262.		UW-1C 30" DIP PO	1,000.00		1,000.00	LF		
263.		UW-1D 30" DIP RJ	775.00		775.00	LF		
264.		UW-1E 24" DIP RJ	15.00		15.00	LF		
265.		UW-1F 12" DIP RJ	225.00		225.00	LF		
266.		UW-1G 8" DIP PO	190.00		190.00	LF		
267.		UW-1H 8" DIP RJ	706.00		706.00	LF		
268.		UW-1I 6" DIP RJ	158.00		158.00	LF		

Bidder Name: _____

Authorized Signature: _____

BID FORM

(Submit in Triplicate)

44th Avenue East Extension Project - from 45th Street East to I-75

Based on Completion Time of 900 Calendar Days

PAY ITEM NO.	FDOT ITEM NUMBER	DESCRIPTION	44th Ave. East- Braden River Segment QTY.	44th Ave. East- 44th Ave. Plaza East to I-75 QTY	TOTAL PROJECT QTY.	UNITS	BID PRICE PER UNIT ($)	TOTAL BID PRICE ($)
269.		UW-1J 4" DIP RJ	60.00		60.00	LF		
270.		UW-1K 8" PVC Pipe PO	3,477.00		3,477.00	LF		
271.		UW-1L 8" PVC Pipe RJ	552.00		552.00	LF		
272.		UW-1M 6" PVC Pipe RJ	80.00		80.00	LF		
		UW-2 Ductile Iron Water Main Fittings						
273.		UW-2A 36" 90 Degree Bend	3.00		3.00	EA		
274.		UW-2B 36" 45 Degree Bend	25.00		25.00	EA		
275.		UW-2C 36" 22.5 Degree Bend	19.00		19.00	EA		
276.		UW-2D 36" 11.25 Degree Bend	4.00		4.00	EA		
277.		UW-2E 36" x 36" Tee	2.00		2.00	EA		
278.		UW-2F 36" x 30" Tee	1.00		1.00	EA		
279.		UW-2G 36" x 24" Tee	1.00		1.00	EA		
280.		UW-2H 36" x 12" Tee	1.00		1.00	EA		
281.		UW-2I 36" x 8" Tee	1.00		1.00	EA		
282.		UW-2J 36" x 6" Tee	8.00		8.00	EA		
283.		UW-2K 36" Cap	2.00		2.00	EA		
284.		UW-2L 30" 45 Degree Bend	12.00		12.00	EA		
285.		UW-2M 30" 22.5 Degree Bend	2.00		2.00	EA		
286.		UW-2N 30" 11.25 Degree Bend	2.00		2.00	EA		
287.		UW-2O 30" x 8" Reducer	1.00		1.00	EA		
288.		UW-2P 30" x 30" Tee	1.00		1.00	EA		
289.		UW-2Q 30" Cap	1.00		1.00	EA		
290.		UW-2R 24" Cap	1.00		1.00	EA		
291.		UW-2S 12" 45 Degree Bend	4.00		4.00	EA		
292.		UW-2T 12" 11.25 Degree Bend	1.00		1.00	EA		
293.		UW-2U 12" x 6" Tee	1.00		1.00	EA		
294.		UW-2V 12" Cap	1.00		1.00	EA		
295.		UW-2W 10" x 8" Reducer	3.00		3.00	EA		
296.		UW-2X 8" 90 Degree Bend	2.00		2.00	EA		

Bidder Name: _____

Authorized Signature: _____

BID FORM

(Submit in Triplicate)

44th Avenue East Extension Project - from 45th Street East to I-75

Based on Completion Time of 900 Calendar Days

PAY ITEM NO.	FDOT ITEM NUMBER	DESCRIPTION	44th Ave. East- Braden River Segment QTY.	44th Ave. East- 44th Ave. Plaza East to I-75 QTY	TOTAL PROJECT QTY.	UNITS	BID PRICE PER UNIT ($)	TOTAL BID PRICE ($)
297.		UW-2Y 8" 45 Degree Bend	18.00		18.00	EA		
298.		UW-2Z 8" 22.5 Degree Bend	5.00		5.00	EA		
299.		UW-2AA 8" 11.25 Degree Bend	9.00		9.00	EA		
300.		UW-2AB 8" x 6" Reducer	2.00		2.00	EA		
301.		UW-2AC 8" x 8" Tee	5.00		5.00	EA		
302.		UW-2AD 8" x 6" Tee	7.00		7.00	EA		
303.		UW-2AE 8" x 4" Tee	1.00		1.00	EA		
304.		UW-2AF 8" Cap	3.00		3.00	EA		
305.		UW-2AG 6" 90 Degree Bend	5.00		5.00	EA		
306.		UW-2AH 6" 45 Degree Bend	2.00		2.00	EA		
307.		UW-2AI 6" x 2" Reducer	1.00		1.00	EA		
308.		UW-2AJ 6" x 6" Tee	5.00		5.00	EA		
309.		UW-2AK 6" Cap	3.00		3.00	EA		
310.		UW-2AL 4" Cap	1.00		1.00	EA		
311.		UW-3 2" PVC Water Main	170.00		170.00	LF		
		UW-4 36" DIP Water Main on New Bridge						
312.		UW-4A 36" DIP/RJ	1,600.00		1,600.00	LF		
313.		UW-4B 36" Expansion Joint	6.00		6.00	EA		
314.		UW-4C Combination Air Valve	1.00		1.00	EA		
315.		UW-4D 36" Pipe Supports	88.00		88.00	EA		
316.		UW-4E Concrete Piles	840.00		840.00	LF		
317.		UW-4F Gravity Thrust Block	125.00		125.00	CY		
318.		UW-4G Pile Cap	31.00		31.00	CY		
319.		UW-4H Concrete Slab	2.00		2.00	CY		
320.		UW-5 10" HDPE by Horizontal Directional Drill (HDD)	220.00		220.00	LF		
321.		UW-6 Temporary 6" Water Main	1.00		1.00	LS		
		UW-7 Butterfly Valve						
322.		UW-7A 36" Butterfly Valve	7.00		7.00	EA		
323.		UW-7B 30" Butterfly Valve	3.00		3.00	EA		

Bidder Name: _____

Authorized Signature: _____

BID FORM

(Submit in Triplicate)

44th Avenue East Extension Project - from 45th Street East to I-75

Based on Completion Time of 900 Calendar Days

PAY ITEM NO.	FDOT ITEM NUMBER	DESCRIPTION	44th Ave. East- Braden River Segment QTY.	44th Ave. East- 44th Ave. Plaza East to I-75 QTY	TOTAL PROJECT QTY.	UNITS	BID PRICE PER UNIT ($)	TOTAL BID PRICE ($)
324.		UW-7C 24" Butterfly Valve	1.00		1.00	EA		
		UW-8 Gate Valve						
325.		UW-8A 12" Gate Valve	2.00		2.00	EA		
326.		UW-8B 8" Gate Valve	11.00		11.00	EA		
327.		UW-8C 6" Gate Valve	9.00		9.00	EA		
328.		UW-8D 4" Gate Valve	1.00		1.00	EA		
329.		UW-8E 2" Gate Valve	1.00		1.00	EA		
330.		UW-9 8" Insertion Valve	2.00		2.00	EA		
331.		UW-10 Fire Hydrant Assembly	15.00		15.00	EA		
		UW-11 Air Release Valves						
332.		UW-11A Above Ground Air Release Valve Assembly	7.00		7.00	EA		
333.		UW-11B Manual Air Release Valve Connection	1.00		1.00	EA		
		UW-12 Water Services						
334.		UW-12A Long Side on 36" Water Main	2.00		2.00	EA		
335.		UW-12B Long Side on 36" Water Main w/ Meter Box Assembly	2.00		2.00	EA		
336.		UW-12C Short Side on 36" Water Main w/ Meter Box Assembly	4.00		4.00	EA		
337.		UW-12D Short Side on 30" Water Main	1.00		1.00	EA		
338.		UW-12E Long Side Service	10.00		10.00	EA		
339.		UW-12F Short Side Service	1.00		1.00	EA		
340.		UW-12G Short Side Service w/ Meter Box Assembly	7.00		7.00	EA		
341.		UW-12H New Short Side Service on 36” WM with Meter Box Assembly & Backflow Preventer (King Property, Sta 216+32)	1.00		1.00	EA		
342.		UW-12I New Short Side Service on 4” WM with Meter Box Assembly & Backflow Preventer (King Property, Sta 917+80)	1.00		1.00	EA		
343.		UW-13 Backflow Preventer	4.00		4.00	EA		
344.		UW-14 Reconnect Water Services for King Property- Allowance	1.00		1.00	LS	$ 20,000.00	$20,000.00
345.		UW-15 Jack & Bore with Steel Casing	75.00		75.00	LF		

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BID FORM

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44th Avenue East Extension Project - from 45th Street East to I-75

Based on Completion Time of 900 Calendar Days

PAY ITEM NO.	FDOT ITEM NUMBER	DESCRIPTION	44th Ave. East- Braden River Segment QTY.	44th Ave. East- 44th Ave. Plaza East to I-75 QTY	TOTAL PROJECT QTY.	UNITS	BID PRICE PER UNIT ($)	TOTAL BID PRICE ($)
346.		UW-16 Elwood I Pump Station Interconnection	1.00		1.00	LS		
		UW-17 Pipeline Interconnections						
347.		UW-17A 51st Street E 36" Interconnection	1.00		1.00	LS		
348.		UW-17B 51st Street E 30" Interconnection	1.00		1.00	LS		
349.		UW-17C Braden River Church Interconnection	1.00		1.00	LS		
		UW-18 Restrain Existing Pipe Joints						
350.		UW-18A Restrain Existing 36" PCCP Pipe Joints	16.00		16.00	EA		
351.		UW-18B Restrain Existing 30" DIP Pipe Joints	11.00		11.00	EA		
352.		UW-18C Restrain Existing 8" Pipe Joints	18.00		18.00	EA		
353.		UW-18D Restrain Existing 6" Pipe Joints	5.00		5.00	EA		
354.		UW-18E Restrain Existing 4" Pipe Joints	3.00		3.00	EA		
	POTABLE WATER REMOVE							
		UWR-1 Remove and Dispose of Existing Pipe						
355.		UWR-1A 36" PCCP	3,020.00		3,020.00	LF		
356.		UWR-1B 36" DIP	67.00		67.00	LF		
357.		UWR-1C 30" DIP	1,705.00		1,705.00	LF		
358.		UWR-1D 8" PVC	5,410.00		5,410.00	LF		
359.		UWR-1E 6" PVC	305.00		305.00	LF		
360.		UWR-1F 4" PVC	250.00		250.00	LF		
361.		UWR-2 Remove and Dispose of Existing Thrust Block at Sta 507+00	100.00		100.00	TON		
362.		UWR-3 Remove and Dispose of Temporary 6" Water Main	1.00		1.00	LS		
363.		UWR-4 Remove and Dispose of Existing Water Services	31.00		31.00	EA		
364.		UWR-5 Remove and Salvage Existing Fire Hydrant Assembly	6.00		6.00	EA		
SUBTOTAL (POTABLE WATER ONLY)								
CONTRACT CONTINGENCY WORK FOR POTABLE WATER (USED ONLY WITH COUNTY APPROVAL)							**10%**	
WASTEWATER								
WASTEWATER FORCE MAIN INSTALL								
		UWW-1 DIP Force Main by Open Cut						

Bidder Name: _____

Authorized Signature: _____

BID FORM

(Submit in Triplicate)

44th Avenue East Extension Project - from 45th Street East to I-75

Based on Completion Time of 900 Calendar Days

PAY ITEM NO.	FDOT ITEM NUMBER	DESCRIPTION	44th Ave. East-Braden River Segment QTY.	44th Ave. East- 44th Ave. Plaza East to I-75 QTY	TOTAL PROJECT QTY.	UNITS	BID PRICE PER UNIT ($)	TOTAL BID PRICE ($)
365.		UWW-1A 10" DIP PO	280.00		280.00	LF		
366.		UWW-1B 10" DIP RJ	113.00		113.00	LF		
367.		UWW-1C 8" DIP PO	1,508.00		1,508.00	LF		
368.		UWW-1D 8" DIP RJ	587.00		587.00	LF		
369.		UWW-1E 6" DIP PO	85.00		85.00	LF		
370.		UWW-1F 6" DIP RJ	230.00		230.00	LF		
371.		UWW-1G 4" DIP RJ	233.00		233.00	LF		
372.		UWW-1H 3" DIP RJ	10.00		10.00	LF		
373.		UWW-1I 10" PVC PO	790.00		790.00	LF		
374.		UWW-1J 10" PVC RJ	75.00		75.00	LF		
375.		UWW-1K 8" PVC PO	1,049.00		1,049.00	LF		
376.		UWW-1L 8" PVC RJ	626.00		626.00	LF		
377.		UWW-1M 2" PVC	125.00		125.00	LF		
		UWW-2 Ductile Iron Force Main Fittings						
378.		UWW-2A 10" 45 Degree Bend	5.00		5.00	EA		
379.		UWW-2B 10" x 8" Reducer	1.00		1.00	EA		
380.		UWW-2C 10" x 8" Wye	1.00		1.00	EA		
381.		UWW-2D 10" x 4" Tee	1.00		1.00	EA		
382.		UWW-2E 8" 45 Degree Bend	37.00		37.00	EA		
383.		UWW-2F 8" 22.5 Degree Bend	2.00		2.00	EA		
384.		UWW-2G 8" 11.25 Degree Bend	1.00		1.00	EA		
385.		UWW-2H 8" x 8" Tee	1.00		1.00	EA		
386.		UWW-2I 8" x 6" Tee	1.00		1.00	EA		
387.		UWW-2J 8" Cap	2.00		2.00	EA		
388.		UWW-2K 6" 45 Degree Bend	9.00		9.00	EA		
389.		UWW-2L 6" 22.5 Degree Bend	1.00		1.00	EA		
390.		UWW-2M 6" 11.25 Degree Bend	1.00		1.00	EA		
391.		UWW-2N 6" Cap	2.00		2.00	EA		
392.		UWW-2O 4" 90 Degree Bend	2.00		2.00	EA		

Bidder Name: _____

Authorized Signature: _____

BID FORM

(Submit in Triplicate)

44th Avenue East Extension Project - from 45th Street East to I-75

Based on Completion Time of 900 Calendar Days

PAY ITEM NO.	FDOT ITEM NUMBER	DESCRIPTION	44th Ave. East-Braden River Segment QTY.	44th Ave. East- 44th Ave. Plaza East to I-75 QTY	TOTAL PROJECT QTY.	UNITS	BID PRICE PER UNIT ($)	TOTAL BID PRICE ($)
393.		UWW-2P 4" 45 Degree Bend	8.00		8.00	EA		
394.		UWW-2Q 4" x 3" Reducer	1.00		1.00	EA		
395.		UWW-2R 4" Cap	2.00		2.00	EA		
396.		UWW-2S 3" 90 Degree Bend	2.00		2.00	EA		
		UWW-3 8" DIP Dry Force Main on New Bridge						
397.		UWW-3A 8" DIP/RJ	1,600.00		1,600.00	LF		
398.		UWW-3B 8" Expansion Joint	6.00		6.00	EA		
399.		UWW-3C Combination Air Valve	1.00		1.00	EA		
400.		UWW-3D 8" Pipe Supports	88.00		88.00	EA		
401.		UWW-4 2" HDPE Force Main by HDD	205.00		205.00	LF		
		UWW-5 Gate Valve						
402.		UWW-5A 8" Gate Valve	6.00		6.00	EA		
403.		UWW-5B 6" Gate Valve	1.00		1.00	EA		
404.		UWW-5C 4" Gate Valve	1.00		1.00	EA		
405.		UWW-6 8" Force Main Bypass Assembly	2.00		2.00	EA		
406.		UWW-7 8" Force Main Pigging Port Assembly	2.00		2.00	EA		
407.		UWW-8 8" Force Main Check Valve Assembly	1.00		1.00	EA		
		UWW-9 Air Release Valves						
408.		UWW-9A Above Ground Air Release Valve	2.00		2.00	EA		
409.		UWW-9B Below Grade Air Release Valve	1.00		1.00	EA		
		UWW-10 Tapping Sleeve and Valve						
410.		UWW-10A 20" x 10" Tapping Sleeve and Valve	1.00		1.00	EA		
411.		UWW-10B 20" x 4" Tapping Sleeve and Valve	2.00		2.00	EA		
412.		UWW-11 Cap 8" Force Main at Old Caruso Road	1.00		1.00	LS		
413.		UWW-12 Offset Existing 20" DIP Force Main	2.00		2.00	EA		
414.		UWW-13 Concrete Encasement of Existing 20" DIP Force	8.00		8.00	EA		
415.		UWW-14 Reset Manhole Frame and Cover	1.00		1.00	EA		
416.		UWW-15 Grinder Lift Station at Elwood I PS	1.00		1.00	LS		
		UWW-16 Restrain Existing Pipe Joints						

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BID FORM

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44th Avenue East Extension Project - from 45th Street East to I-75

Based on Completion Time of 900 Calendar Days

PAY ITEM NO.	FDOT ITEM NUMBER	DESCRIPTION	44th Ave. East-Braden River Segment QTY.	44th Ave. East- 44th Ave. Plaza East to I-75 QTY	TOTAL PROJECT QTY.	UNITS	BID PRICE PER UNIT ($)	TOTAL BID PRICE ($)
417.		UWW-16A Restrain Existing 8" Pipe Joints	2.00		2.00	EA		
418.		UWW-16B Restrain Existing 3" Pipe Joints	1.00		1.00	EA		
	WASTEWATER GRAVITY SEWER INSTALL							
		UWW-17 Connect to Existing Manhole						
419.		UWW-17A 8" Sanitary Connection	1.00		1.00	EA		
420.		UWW-17B 2" Force Main Connection	1.00		1.00	EA		
421.		UWW-18 8" PVC Gravity Sewer Pipe by Open Cut	565.00		565.00	LF		
422.		UWW-19 Sanitary Sewer Manhole & Cover	1.00		1.00	EA		
423.		UWW-20 Apply Spray Liner to Existing Manhole	3.00		3.00	EA		
	WASTEWATER REMOVE							
		UWWR-1 Remove and Dispose of Existing Force Main						
424.		UWWR-1A 8" PVC	1,320.00		1,320.00	LF		
425.		UWWR-1B 6" PVC	140.00		140.00	LF		
426.		UWWR-1C 3" PVC	10.00		10.00	LF		
427.		UWWR-2 Remove and Dispose of Manhole with CV & ARV	1.00		1.00	EA		
428.		UWWR-3 Remove and Dispose of Septic System at Elwoo	1.00		1.00	EA		
SUBTOTAL (WASTEWATER ONLY)								
CONTRACT CONTINGENCY WORK FOR WASTEWATER (USED ONLY WITH COUNTY APPROVAL)							**10%**	
	RECLAIMED WATER							
		URW-1 Reclaimed Water Main by Open Cut						
429.		URW-1A 12" DIP RJ	80.00		80.00	LF		
430.		URW-1B 8" DIP RJ	130.00		130.00	LF		
431.		URW-1C 6" DIP RJ	90.00		90.00	LF		
		URW-2 Ductile Iron Reclaimed Water Main Fittings						
432.		URW-2A 12" 45 Degree Bend	3.00		3.00	EA		
433.		URW-2B 12" x 6" Reducer	1.00		1.00	EA		
434.		URW-2C 12" x 12" Tee	1.00		1.00	EA		
435.		URW-2D 12" Cap	1.00		1.00	EA		
436.		URW-2E 8" 45 Degree Bend	6.00		6.00	EA		

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BID FORM

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44th Avenue East Extension Project - from 45th Street East to I-75

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PAY ITEM NO.	FDOT ITEM NUMBER	DESCRIPTION	44th Ave. East-Braden River Segment QTY.	44th Ave. East- 44th Ave. Plaza East to I-75 QTY	TOTAL PROJECT QTY.	UNITS	BID PRICE PER UNIT ($)	TOTAL BID PRICE ($)
437.		URW-2F 8" Cap	2.00		2.00	EA		
438.		URW-2G 6" 45 Degree Bend	4.00		4.00	EA		
439.		URW-2H 6" Cap	2.00		2.00	EA		
		URW-3 Gate Valve						
440.		URW-3A 12" Gate Valve	1.00		1.00	EA		
441.		URW-3B 6" Gate Valve	1.00		1.00	EA		
442.		URW-4 Reclaimed Water Fire Hydrant Assembly	5.00		5.00	EA		
		URW-5 Reclaimed Water Services						
443.		URW-5A Single RW Service - Replace Service Line	4.00		4.00	EA		
444.		URW-5B Single RW Service - Replace Service Line & Meter Box	4.00		4.00	EA		
445.		URW-5C Double RW Service - Replace Service Line	4.00		4.00	EA		
446.		URW-5D Double RW Service - Replace Service Line & Meter Box	1.00		1.00	EA		
		RECLAIMED WATER REMOVE						
447.		URWR-1 Remove and Dispose of Existing Reclaimed Water Services	13.00		13.00	EA		
448.		URWR-2 Remove and Salvage Existing Reclaimed Water FHA	1.00		1.00	EA		
SUBTOTAL (RECLAIMED WATER ONLY)								
CONTRACT CONTINGENCY WORK FOR RECLAIMED WATER (USED ONLY WITH COUNTY APPROVAL)							**10%**	
	TOTAL BASE BID - Based on Completion Time of 900 Calendar Days							
	CONTRACT CONTINGENCY WORK (USED ONLY WITH COUNTY APPROVAL)						10%	
	TOTAL OFFER FOR BID with Contract Contingency - Based on Completion Time of 900 Calendar Days							

Bidder Name: _____

Authorized Signature: _____

CONTRACT DOCUMENTS

FOR

44th Avenue East – Braden River Segment
(45th Street East to 44th Avenue Plaza East)
Utilities

PROJECT #6086960

February 2019
Bid Submittal

PROJECT OWNER:

County of Manatee, Florida
c/o Manatee County Procurement Division
1112 Manatee Avenue West
Bradenton, Florida 34205
(941) 748-3014

PREPARED BY:

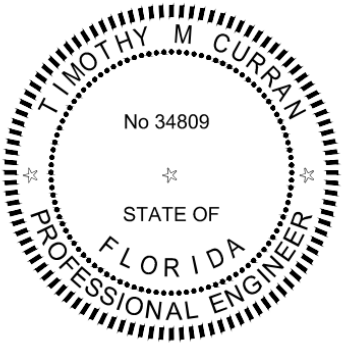
Engineering Division
Manatee County Public Works Department
1022 26th Avenue East
Bradenton, Florida 34208
(941) 708-7450

MODIFIED BY:

AECOM
7650 West Courtney Campbell Causeway
Tampa, Florida 33607
(813) 286-1711

Manatee County
44th Avenue East – Braden River Segment
(45th Street East to 44th Avenue Plaza East)
Utilities

Engineer of Record

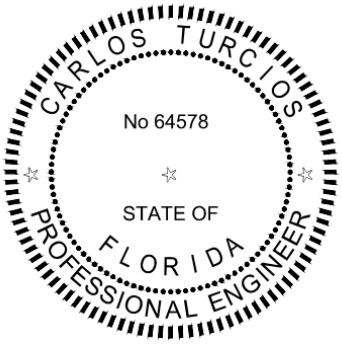


THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY:

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED. THE SIGNATURE MUST BE VERIFIED ON THE ELECTRONIC DOCUMENTS.

AECOM TECHNICAL SERVICES, INC.
7650 W. COURTNEY CAMPBELL CAUSEWAY
TAMPA, FL 33607
CERTIFICATE OF AUTHORIZATION: 00008115
TIMOTHY M. CURRAN, P.E.

Civil/Mechanical Engineer: AECOM Timothy M. Curran, PE #34809



THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY:

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED. THE SIGNATURE MUST BE VERIFIED ON THE ELECTRONIC DOCUMENTS.

AECOM TECHNICAL SERVICES, INC.
7650 W. COURTNEY CAMPBELL CAUSEWAY
TAMPA, FL 33607
CERTIFICATE OF AUTHORIZATION: 00008115
CARLOS TURCIOS, P.E.

Electrical Engineer: AECOM Carlos Turcios, PE #64578

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This specification includes by reference the **MANATEE COUNTY PUBLIC WORKS STANDARDS, PART I UTILITIES STANDARDS MANUAL dated July 2019**. Please note that valves for new 30-inch and 36-inch water mains shall remain butterfly valves. Valves for new force mains shall remain gate valves.

In lieu of products / manufactures named in these specifications, all items and/or materials furnished and installed shall conform to the **Manatee County Approved Products List**. The term "or equal" is no longer valid; all products must be from the **Manatee County Approved Products List**. With the exception of butterfly valves, which shall meet the requirements of Specification Section 02640, Valves and Appurtenances, 2.04. All items listed in the submittal requirements under each section shall be required to be submitted for review and/or acceptance.

Specification Sections Modified by AECOM with Description of Modification:

Section 01010, Summary of Work for County Owned Utility Relocations –
Description of project work

Section 01150, Measurement and Payment –
Bid item descriptions

Section 02615, Ductile Iron Pipe and Fittings –
Restraining

Section 02640, Valves and Appurtenances –
Restraining
Insertion valves
Flange, mechanical joint and restraining hardware materials

Section 03500, Lift Station Specification –
Clarified that the Grinder Lift Station telemetry antenna will be mounted on an existing mast

Section 09900, Painting –
Specified paint color for pipes on bridge
Updated Tnemec paint systems provided by Tnemec to be project specific

Updated overall specifications (based on 04.07.2017 version) to be consistent with current version of Manatee County Standard Specifications dated 06.20.2019.

DIVISION 1 -

GENERAL REQUIREMENTS

SECTION 01010 SUMMARY OF WORK FOR COUNTY OWNED UTILITY RELOCATIONS

PART 1 GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS/REQUIREMENTS INCLUDED

A. These specifications apply to the relocation of County owned utilities and include construction of potable water, wastewater and reclaimed water utilities, as shown on the Drawings.

B. The Contractor shall furnish all shop drawings, working drawings, labor, materials, equipment, tools, services and incidentals necessary to complete all work required by these Specifications and as shown on the Contract Drawings.

C. The Contractor shall perform the work complete, in place and ready for continuous service and shall include any repairs, replacements, and/or restoration required as a result of damages caused prior to acceptance by the County.

D. The Contractor shall furnish and install all materials, equipment and labor which is reasonably and properly inferable and necessary for the proper completion of the work, whether specifically indicated in the Contract Documents or not.

1.02 CONTRACTS

Construct all the Work under a single contract.

1.03 WORK SEQUENCE

A. All work done under this Contract shall be done with a minimum of inconvenience to the users of the system or facility. The Contractor shall coordinate his work with private property owners such that existing utility services are maintained to all users to the maximum extent possible.

B. The Contractor shall, if necessary and feasible, construct the work in stages to accommodate the County's use of the premises during the construction period; coordinate the construction schedule and operations with the County's Representative.

C. The Contractor shall, where feasible, construct the Work in stages to provide for public convenience and not close off public use of any facility until completion of construction to provide alternative usage.

1.04 CONSTRUCTION AREAS

A. The Contractor shall: Limit his use of the construction areas for work and for storage, to allow for:

1. Work by other Contractors.
2. County's Use.
3. Public Use.

B. Coordinate use of work site under direction of County's Representative.

C. Assume full responsibility for the protection and safekeeping of products under this

Contract, stored on the site.

D. Move any stored products under the Contractor's control, which interfere with operations of the County or separate contractor.

E. Obtain and pay for the use of additional storage of work areas needed for Contractor operations.

1.05 COUNTY OCCUPANCY

A. It is assumed that portions of the Work will be completed prior to completion of the entire Work. Upon completion of construction of each individual facility, including testing, if the County, at its sole discretion, desires to accept the individual facility, the Contractor will be issued a dated certificate of completion and acceptance for each individual facility. The County will assume ownership and begin operation of the individual facility on that date and the three-year guaranty period shall commence on that date. The County has the option of not accepting the entire work as a whole until it is completed, tested and approved by the County.

1.06 PARTIAL COUNTY OCCUPANCY

The Contractor shall schedule his operations for completion of portions of the Work, as designated, for the County's occupancy prior to substantial completion of the entire work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01150 MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 SCOPE

A. The scope of this section of the Contract Documents is to further define the items included in each Bid Item in the Bid Form section of the Contract Documents. Payment will be made based on the specified items included in the description in this section for each bid item.

B. All contract prices included in the Bid Form section will be full compensation for all shop drawings, working drawings, labor, materials, tools, equipment and incidentals necessary to complete the construction as shown on the Drawings and/or as specified in the Contract Documents to be performed under this Contract. Actual quantities of each item bid on a unit price basis will be determined upon completion of the construction in the manner set up for each item in this section of the Specifications. Payment for all items listed in the Bid Form will constitute full compensation for all work shown and/or specified to be performed under this Contract.

1.02 ESTIMATED QUANTITIES

The quantities shown are approximate and are given only as a basis of calculation upon which the award of the Contract is to be made. The County does not assume any responsibility for the final quantities, nor shall the Contractor claim misunderstanding because of such estimate of quantities. Final payment will be made only for satisfactorily completed quantity of each item.

1.03 WORK OUTSIDE AUTHORIZED LIMITS

No payment will be made for work constructed outside the authorized limits of work.

1.04 MEASUREMENT STANDARDS

Unless otherwise specified for the particular items involved, all measurements of distance shall be taken horizontally or vertically.

1.05 AREA MEASUREMENTS

In the measurement of items to be paid for on the basis of area of finished work, the lengths and/or widths to be used in the calculations shall be the final dimensions measured along the surface of the completed work within the neat lines shown or designated.

1.06 LUMP SUM ITEMS

Where payment for items is shown to be paid for on a lump sum basis, no separate payment will be made for any item of work required to complete the lump sum items. Lump sum contracts shall be complete, tested and fully operable prior to request for final payment. Contractor may be required to provide a break-down of the lump sum totals.

1.07 UNIT PRICE ITEM

Separate payment will be made for the items of work described herein and listed on the Bid Form. Any related work not specifically listed, but required for satisfactory completion of the

work shall be considered to be included in the scope of the appropriate listed work items.

No separate payment will be made for the following items and the cost of such work shall be included in the applicable pay items of work. Final payments shall not be requested by the Contractor or made by the County until as-built (record) drawings have been submitted and approved by the County.

1. Project signs and photographs.
2. Removal, repair, replacement or relocation of all signs, walls, private irrigation systems and related items.
3. Rubbish and spoil removal.
4. Shop Drawings, Working Drawings.
5. Clearing, grubbing and grading except as hereinafter specified.
6. Trench excavation, including necessary pavement removal and rock removal, except as otherwise specified.
7. Dewatering and disposal of surplus water.
8. Structural fill, backfill, and grading.
9. Replacement of unpaved roadways, and shrubbery plots.
10. Cleanup & miscellaneous work.
11. Foundation and borrow materials, except as hereinafter specified.
12. Testing and placing system in operation.
13. Any material and equipment required to be installed and utilized for the tests.
14. Pipe, structures, pavement replacement, asphalt and shell driveways and/or appurtenances included within the limits of lump sum work, unless otherwise shown.
15. Maintaining the existing quality of service during construction.
16. Appurtenant work as required for a complete and operable system.
17. Seeding and hydromulching.

~~1. Shop Drawings, Working Drawings.~~
~~2. Clearing, grubbing and grading except as hereinafter specified.~~
~~3. Trench excavation, including necessary pavement removal and rock removal, except as otherwise specified.~~
~~4. Dewatering and disposal of surplus water.~~
~~5. Structural fill, backfill, and grading.~~
~~6. Replacement of unpaved roadways, and shrubbery plots.~~
~~7. Cleanup and miscellaneous work.~~
~~8. Foundation and borrow materials, except as hereinafter specified.~~
~~9. Testing and placing system in operation.~~
~~10. Any material and equipment required to be installed and utilized for the tests.~~
~~11. Pipe, structures, pavement replacement, asphalt and shell driveways and/or appurtenances included within the limits of lump sum work, unless otherwise shown.~~
~~12. Maintaining the existing quality of service during construction.~~
~~13. Maintaining or detouring of traffic.~~
~~14. Appurtenant work as required for a complete and operable system.~~
~~15. Seeding and hydromulching.~~
~~16. As-built Record Drawings.~~

A. GENERAL

BID ITEM # UG-1 – UNSUITABLE MATERIAL EXCAVATION BELOW GRADE

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid for the removal and disposal of insitu soil materials deemed unsuitable for use as pipe bedding or trench backfill by the Engineer or Owner. Contractor shall obtain approval of Owner prior to performing work. Measurement shall be made for the actual volume in cubic yards of material

removed and disposed of as determined by field dimensions or survey. The unit bid price includes labor, equipment, excavation, hauling, disposal, dewatering, and incidental items necessary to accomplish the work.

BID ITEM # UG-2 – SELECT BACKFILL BELOW GRADE

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid for providing select backfill below grade in areas where unsuitable soil was removed. Contractor shall obtain approval of Owner prior to performing work. Measurement shall be made for the actual volume in cubic yards of material furnished, placed and compacted as determined by field dimensions or survey. The unit bid price includes labor, materials, equipment, excavation, hauling, disposal, dewatering, and incidental items necessary to accomplish the work.

BID ITEM # UG-3 CRUSHED STONE PIPE BEDDING

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid for furnishing and installing #57 stone for use as pipe bedding where applicable as determined by the Engineer or Owner. Contractor shall obtain approval of Owner prior to performing work. Measurement shall be made for the actual volume in cubic yards of material furnished, placed and compacted as determined by field measurement or survey. The unit bid price includes labor, materials, equipment, excavation, hauling, disposal, dewatering and incidental items necessary to accomplish the work.

BID ITEM # UG-4 – PERMANENT ROADWAY RESTORATION

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid for permanent roadway restoration as shown on the Contract Drawings and listed in the Bid Form. This pay item is to be used for existing roadway impacted by utility installation that is outside the limits of the roadway widening project. Payment will be made for the square yards of pavement installed at the applicable contract unit price and shall include asphaltic concrete, base material, sub-base material, compaction, miscellaneous equipment and materials, testing and incidental work items necessary to accomplish the work.

BID ITEM # UG-5 – TEMPORARY ROADWAY RESTORATION

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid for temporary roadway restoration as shown on the Contract Drawings and listed in the Bid Form. This pay item is to be used for repairing existing roadway impacted by utility installation that is within the limits of the roadway widening project but will be reconstructed at a later stage of the project. Payment will be made for the square yards of pavement installed at the applicable contract unit price and shall include asphaltic concrete, base material, sub-base material, compaction, miscellaneous equipment and materials, testing and incidental work items necessary to accomplish the work.

BID ITEM # UG-6 – PATCH ROADWAY IMPACTED BY PIPE RESTRAINT INSTALLATION

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid for patching existing roadway that is impacted by pipe restraint installation as shown on the Contract Drawings and listed in the Bid Form. This pay item is to be used for existing roadway impacted by pipe restraint installation on existing pipelines that is outside the limits of the roadway widening project. Payment will be made for the square yards of pavement installed at the applicable contract unit price and shall include asphaltic concrete, base material, sub-base material, compaction, miscellaneous equipment and materials, testing and incidental work items necessary to accomplish the work.

BID ITEM # UG-7 – ASPHALT OVERLAY

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid for asphalt pavement overlay as shown on the Contract Drawings and listed in the Bid Form.

Measurement will be the horizontal measurement of the square yards of asphaltic concrete paving acceptably furnished and installed as determined by field dimensions or survey. The unit bid price includes furnishing and installing asphaltic concrete, surface asphalt milling, pavement striping, reflectors, manhole casting adjustment, miscellaneous equipment and materials, testing and incidental work items necessary to accomplish the work.

BID ITEM # UG-8 – DRIVEWAY RESTORATION

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid for driveway restoration as shown on the Contract Drawings and listed in the Bid Form. This pay item is to be used for existing driveways that are impacted by utility installation that is outside the limits of the roadway widening project. Payment will be made for the square yards of concrete driveway installed at the applicable contract unit price and shall include concrete or asphalt/compacted base material, sub-base material, compaction, miscellaneous equipment and materials, testing and incidental work items necessary to accomplish the work.

BID ITEM # UG-9 – SOD RESTORATION

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid for sod restoration as shown on the Contract Drawings and listed in the Bid Form. This pay item is to be used for areas that are impacted by utility installation that are outside the limits of the roadway widening project. Payment will be made for the square yards of sod installed at the applicable contract unit price and shall include all labor, equipment, soil preparation, furnishing and installing sod, rolling, mowing, watering and any other measures necessary to establish and maintain a healthy stand of grass until the Engineer/Owner accepts the work.

BID ITEM # UG-10 – TREE REPLACEMENT

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid for each tree replacement as shown on the Contract Drawings and listed in the Bid Form. This pay item is to be used to replace existing trees, if necessary, in kind with 3-inch caliper trees where the new 30-inch potable water main will be installed from approximately Sta 172+00 to 177+00. Payment will be made for the actual number of trees installed at the applicable contract unit price and shall include all labor, materials, equipment, soil preparation, planting soil, staking, mulch, watering until established, and any other measures necessary to establish and maintain a healthy tree until the Engineer/Owner accepts the work.

BID ITEM # UG-11 - DISCRETIONARY WORK

Payment for all work under this Bid Item and listed in the Bid Form shall be made only at the Owner's discretion for items that are not indicated but are necessary to satisfactorily complete the project in accordance with the Plans and Specifications.

B. POTABLE WATER INSTALL

BID ITEM #UW-1 WATER MAIN BY OPEN CUT

Payment for all work included in these Bid Items shall be made at the applicable Contract unit price bid per the schedule of prices for furnishing and installing the listed diameter and material water main pipe as shown on the Contract Drawings and listed in the Bid Form. Measurement and Payment shall be made for the actual length of the listed diameter and material pipe installed and will represent full compensation for all labor, materials, tree trimming and removal as needed, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, furnish and installing pipe, restraining devices, thrust blocks where indicated on the drawings, connections to existing pipelines (except those described below in separate Bid Items), concrete encasement, detection tape, polywrapping, tracer wire installation and testing, backfill, regrading of ditches, drainage pipe and structures restoration, compaction, grading, cleaning, testing and disinfection, maintenance of traffic (MOT) if needed, supporting and protecting of

existing underground or aboveground utilities including associated utility coordination, equipment, and all other items necessary to complete these Bid Items. No additional compensation will be made for excavation below the bottom of the pipe, for rock removal or bedding and backfill material, or for repair of any trench settlement. Multiple pressure and bacteriological tests may be required in order to maintain service and due to utility and MOT construction Phasing.

BID ITEM #UW-1A	36-inch DIP PO
BID ITEM #UW-1B	36-inch DIP RJ
BID ITEM #UW-1C	30-inch DIP PO
BID ITEM #UW-1D	30-inch DIP RJ
BID ITEM #UW-1E	24-inch DIP RJ
BID ITEM #UW-1F	12-inch DIP RJ
BID ITEM #UW-1G	8-inch DIP PO
BID ITEM #UW-1H	8-inch DIP RJ
BID ITEM #UW-1I	6-inch DIP RJ
BID ITEM #UW-1J	4-inch DIP RJ
BID ITEM #UW-1K	8-inch PVC PO
BID ITEM #UW-1L	8-inch PVC RJ
BID ITEM #UW-1M	6-inch PVC RJ

BID ITEM #UW-2 DUCTILE IRON WATER MAIN FITTINGS

Payment for all work included in these Bid Items shall be made at the applicable Contract unit price bid per the schedule of prices for furnishing and installing the listed diameter and type water main fittings as shown on the Contract Drawings and listed in the Bid Form. Measurement and Payment shall be made for the number of the listed diameter fittings installed and will represent full compensation for all labor, materials, tree trimming and removal as needed, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, furnish and installing pipe, restraining devices, thrust blocks where indicated on the drawings, connections to existing pipelines (except those described below in separate Bid Items), concrete encasement, detection tape, polywrapping, tracer wire installation and testing, backfill, regrading of ditches, drainage pipe and structures restoration, compaction, grading, cleaning, testing and disinfection, maintenance of traffic (MOT) if needed, supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment, and all other items necessary to complete these Bid Items. No additional compensation will be made for excavation below the bottom of the pipe, for rock removal or bedding and backfill material, or for repair of any trench settlement.

BID ITEM #UW-2A	36-inch 90 Degree Bend
BID ITEM #UW-2B	36-inch 45 Degree Bend
BID ITEM #UW-2C	36-inch 22.5 Degree Bend
BID ITEM #UW-2D	36-inch 11.25 Degree Bend
BID ITEM #UW-2E	36-inch x 36-inch Tee
BID ITEM #UW-2F	36-inch x 30-inch Tee
BID ITEM #UW-2G	36-inch x 24-inch Tee
BID ITEM #UW-2H	36-inch x 12-inch Tee
BID ITEM #UW-2I	36-inch x 8-inch Tee
BID ITEM #UW-2J	36-inch x 6-inch Tee
BID ITEM #UW-2K	36-inch Cap
BID ITEM #UW-2L	30-inch 45 Degree Bend
BID ITEM #UW-2M	30-inch 22.5 Degree Bend
BID ITEM #UW-2N	30-inch 11.25 Degree Bend
BID ITEM #UW-2O	30-inch x 8-inch Reducer

BID ITEM #UW-2P 30-inch x 30-inch Tee
BID ITEM #UW-2Q 30-inch Cap

BID ITEM #UW-2R 24-inch Cap

BID ITEM #UW-2S 12-inch 45 Degree Bend
BID ITEM #UW-2T 12-inch 11.25 Degree Bend
BID ITEM #UW-2U 12-inch x 6-inch Tee
BID ITEM #UW-2V 12-inch Cap

BID ITEM #UW-2W 10-inch x 8-inch Reducer

BID ITEM #UW-2X 8-inch 90 Degree Bend
BID ITEM #UW-2Y 8-inch 45 Degree Bend
BID ITEM #UW-2Z 8-inch 22.5 Degree Bend
BID ITEM #UW-2AA 8-inch 11.25 Degree Bend
BID ITEM #UW-2AB 8-inch x 6-inch Reducer
BID ITEM #UW-2AC 8-inch x 8-inch Tee
BID ITEM #UW-2AD 8-inch x 6-inch Tee
BID ITEM #UW-2AE 8-inch x 4-inch Tee
BID ITEM #UW-2AF 8-inch Cap

BID ITEM #UW-2AG 6-inch 90 Degree Bend
BID ITEM #UW-2AH 6-inch 45 Degree Bend
BID ITEM #UW-2AI 6-inch x 2-inch Reducer
BID ITEM #UW-2AJ 6-inch x 6-inch Tee
BID ITEM #UW-2AK 6-inch Cap

BID ITEM #UW-2AL 4-inch Cap

BID ITEM #UW-3 2-INCH PVC WATER MAIN

Payment for all work included in this Bid Item shall be made at the applicable contract unit price bid for furnishing and installing 2-inch diameter PVC pipe as shown on the Contract Drawings and listed in the Bid Form. Measurement and Payment shall be made for the actual length of the 2-inch PVC pipe installed and will represent full compensation for all labor, materials, tree trimming and removal as needed, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, furnish and installing pipe, fittings, restraining devices, thrust blocks where indicated on the drawings, concrete encasement, detection tape, tracer wire installation and testing, backfill, regrading of ditches, drainage pipe and structures restoration, compaction, grading, cleaning, testing and disinfection, maintenance of traffic (MOT) if needed, supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment, and all other items necessary to complete this Bid Item. No additional compensation will be made for excavation below the bottom of the pipe, for rock removal or bedding and backfill material, or for repair of any trench settlement.

BID ITEM #UW-4 36-INCH DIP WATER MAIN ON NEW BRIDGE

Payment for all work included in these Bid Items shall be made at the applicable contract bid prices for furnishing and installing the 36-inch diameter DIP water main pipe, fittings, and supports on the new 44th Avenue East Bridge over the Braden River as shown on the Contract Drawings and listed in the Bid Form. Measurement and Payment shall be made on an individual bid price basis within the respective limits of the pay items shown below and will represent full compensation for all labor, materials, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, furnishing and installing pipe, fittings, expansion joints, combination air valve and

accessories, pipe supports, pipe straps, coatings, restraining devices, thrust blocks where indicated on the drawings, gravity thrust blocks, pile caps, piles, concrete slabs, backfill, compaction, cleaning, testing and disinfection, equipment and all other items necessary to complete this Bid Item. The listing below provides a breakdown of pay items for the major components of work associated with the installation of 36-inch DIP water main on the new bridge. Prior to submitting an invoice for work performed, the Contractor shall submit to the Engineer for approval a detailed accounting of all work to be performed with each bid item. All work associated with installing the 36-inch water main on the bridge must be accounted for within pay items UW-4A through-UW-4H.

BID ITEM #UW-4A 36" DIP/RJ	Pay item per linear foot of pipe installed
BID ITEM #UW-4B 36" Expansion Joint	Pay item per each expansion joint installed
BID ITEM #UW-4C Combination Air Valve	Pay item per each valve installed
BID ITEM #UW-4D 36" Pipe Supports	Pay item per each pipe support installed
BID ITEM #UW-4E Concrete Piles	Pay item per linear foot of pile installed
BID ITEM #UW-4F Gravity Thrust Block	Pay item per cubic yard of concrete installed
BID ITEM #UW-4G Pile Cap	Pay item per cubic yard of concrete installed
BID ITEM #UW-4H Concrete Slab	Pay item per cubic yard of concrete installed

BID ITEM #UW-5 10-INCH HDPE BY HORIZONTAL DIRECTIONAL DRILL (HDD)

Payment for all work included in this Bid Item shall be made at the applicable contract unit price bid for furnishing and installing 10-inch diameter HDPE pipe via horizontal directional drilling (HDD) as shown on the Contract Drawings and listed in the Bid Form. Measurement and payment shall be made for the actual length of HDPE pipe installed as measured horizontally above the centerline of the pipe and will represent full compensation for all labor, materials, tree trimming and removal if needed, excavation (including rock), dewatering, bracing, sheeting and shoring, exploratory pits, launching and receiving pits, machinery, construction equipment, directional boring equipment, drilling fluids, fittings, joints and jointing materials, DI/HDPE mechanical joint adapters, tracer wires installation and testing, disposal of spoil and drilling fluids, boring path report, bedding, backfilling, compaction, regrading, hydrostatic testing, cleaning, testing and disinfection, maintenance of traffic (MOT) if needed, drainage, erosion and sedimentation control, drilling fluid release monitoring and cleanup, supporting and protecting of existing underground or aboveground utilities including associated utility coordination, and all other items necessary to complete this Bid Item.

BID ITEM #UW-6 TEMPORARY 6-INCH WATER MAIN

Payment for all work included in this Bid Item shall be made at the applicable contract lump sum bid price for furnishing and installing the temporary 6” water main pipe and fittings on Morgan Johnson Road as shown on the Contract Drawings and listed in the Bid Form. Payment shall represent full compensation for all labor, materials, work area clearing and grubbing, tree trimming and removal if needed, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, furnish and installing pipe, fittings, restraining devices, thrust blocks where indicated on the drawings, connections to existing pipelines, backfill, compaction, grading, cleaning, testing and disinfection, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete this Bid Item. No additional compensation will be made for excavation below the bottom of the pipe, for rock removal or bedding and backfill material, or for repair of any trench settlement.

BID ITEM #UW-7 BUTTERFLY VALVE

Payment for all work included in these Bid Items shall be made at the applicable Contract unit price bid per each valve for furnishing and installing the listed diameter valve, box, cover, tag, tracer wire and test station box, and concrete pad as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, material, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, backfill,

compaction, cleaning, testing and disinfection, testing of tracer wire, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete these Bid Items.

BID ITEM #UW-7A 36-inch Butterfly Valve
BID ITEM #UW-7B 30-inch Butterfly Valve
BID ITEM #UW-7C 24-inch Butterfly Valve

BID ITEM #UW-8 GATE VALVE

Payment for all work included in these Bid Items shall be made at the applicable Contract unit price bid per each valve for furnishing and installing the listed diameter valve, box, cover, tag, tracer wire and test station box, and concrete pad as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, material, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, backfill, compaction, cleaning, testing and disinfection, testing of tracer wire, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete these Bid Items.

BID ITEM #UW-8A 12-inch Gate Valve
BID ITEM #UW-8B 8-inch Gate Valve
BID ITEM #UW-8C 6-inch Gate Valve
BID ITEM #UW-8D 4-inch Gate Valve
BID ITEM #UW-8E 2-inch Gate Valve

BID ITEM #UW-9 8-INCH INSERTION VALVE

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid per each 8-inch insertion valve as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, material, excavation, including rock, sheeting and shoring, dewatering, erosion and sedimentation control, furnishing and installing insertion valve, bedding, backfill, compaction, cleaning, testing and disinfection, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete this Bid Item. For permanent installation, bid item also includes furnishing and installing insertion valve, box, cover, tag, tracer wire and test station box, concrete pad, and polyethylene encasement, and testing of tracer wire. For temporary installations, Contractor shall provide insertion valve to County after it has been removed.

BID ITEM #UW-10 FIRE HYDRANT ASSEMBLY

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid per each fire hydrant assembly for furnishing and installing the hydrant lead, gate valve, box cover, concrete pads, tracer wire and test station box, restraining rods and/or thrust blocks, as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, materials, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, backfill, polyethylene encasement, compaction, testing, disinfection, testing of tracer wire, maintenance of traffic (MOT), and supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete this Bid Item.

BID ITEM #UW-11 AIR RELEASE VALVES

Payment for all work included in these Bid Items shall be made at the applicable contract unit price bid for furnishing and installing the listed size air release valve assembly or manual air release valve connection including the vent pipe, gate valve, corp stop, concrete pad, cabinet, tracer wire and test box, lockable meter box (at Sta 504+60) and extended concrete pad (at Sta 504+60), as shown

on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, material, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, backfill, compaction, cleaning, testing and disinfection, testing of tracer wire, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete these Bid Items.

BID ITEM #UW-11A Above Ground Air Release Valve Assembly
BID ITEM #UW-11B Manual Air Release Valve Connection (Sta 504+60)

BID ITEM #UW-12 WATER SERVICES

Payment for all work included in these Bid Items shall be made at the applicable Contract unit price bid per each water service type for furnishing and installing the listed individual water service line and meter box (where applicable), removing and reinstalling the existing water meter (where applicable), connecting the new service line to the existing service line, and temporary relocation of existing service line (if necessary) for construction of new utilities, as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, material, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, tracer wire installation and testing, directional drilling, connections to existing pipelines, bedding, backfill, compaction, cleaning, testing and disinfection, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete these Bid Items. This activity shall be coordinated with the private property owner to ensure minimum interruption of potable water service.

BID ITEM #UW-12A Long Side on 36-inch Water Main
BID ITEM #UW-12B Long Side on 36-inch Water Main with Meter Box Assembly
BID ITEM #UW-12C Short Side on 36-inch Water Main with Meter Box Assembly
BID ITEM #UW-12D Short Side on 30-inch Water Main
BID ITEM #UW-12E Long Side Service
BID ITEM #UW-12F Short Side Service
BID ITEM #UW-12G Short Side Service with Meter Box Assembly
BID ITEM #UW-12H New Short Side Service on 36" WM with Meter Box Assembly & Backflow Preventer (King Property, Sta 216+32)
BID ITEM #UW-12I New Short Side Service on 4" WM with Meter Box Assembly & Backflow Preventer (King Property, Sta 917+80)

BID ITEM #UW-13 BACKFLOW PREVENTER

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid per each back flow preventer for removing the existing back flow preventer assembly, furnishing and installing the new back flow preventer assembly and service line from the new meter box at the roadway right-of-way to the existing service line on private property, and connecting to the existing service line, as shown on the Contract Drawings and listed on the Bid Form.

The Contractor shall coordinate with each private property owner on all aspects of siting the back flow preventer and routing the water service line from the new water service meter and connecting to the existing service line. The Contractor shall be responsible for meeting with each individual private property owner to coordinate the routing of the water service line on private property prior to the commencement of any work. The Contractor shall document the agreed upon route on a sketch signed and dated by all parties.

This Bid Item includes abandoning in place a small portion of the existing water service line (on private property) in accordance with the Florida Building Code – Building and Plumbing.

Manatee County Building Permits, in the amount of $75 each, will be required for all private properties, with up to 10 adjacent properties included on each permit. This item includes all permits, material, labor, equipment, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, backfill, compaction, testing and disinfection, surface restoration, certification and inspection fees, temporary measures, removal and disposal of existing back flow preventer assembly, and all other items necessary perform the work in a manner conforming to all pertinent sections of the Florida Building Code – Building and Plumbing and the Manatee County Building Department. This activity shall be coordinated with the private property owner to ensure minimum interruption of potable water service.

BID ITEM #UW-14 RECONNECT WATER SERVICES FOR KING PROPERTY

The location of the existing service lines leaving the existing water meter/BFP assemblies at Sta 501+05 on Morgan Johnson Road at 44th Avenue East serving the King property to the South is unknown. Contractor shall locate the existing service lines and provide a proposed approach and cost for connecting the existing service lines on private property to the new water meter/BFP assemblies at Sta 325+40, remove abandoned service lines in the new right of way, and abandon in place the existing water service lines on private property in accordance with the Florida Building Code – Building and Plumbing. This pay item includes labor, materials, equipment, dewatering, excavation, surface restoration, and all other items necessary to complete the work. The Contractor shall coordinate with the property owner(s), meeting with them to coordinate the routing of the water service line on private property prior to the commencement of any work. The Contractor shall document the agreed upon route on a sketch signed and dated by all parties. The Contractor shall inform the property Owner when the connection will occur. **An allowance of $20,000 is provided for this Bid Item**. Actual payment will be based on the approved approach and cost.

BID ITEM #UW-15 JACK & BORE WITH STEEL CASING

Payment for all work included in this Bid Item shall be made at the applicable contract unit price bid per linear foot for furnishing and installing 14-inch diameter steel casing (for 6-inch DIP under separate Bid Item), carrier pipe spacers, and end seals via Jack & Bore as shown on the contract drawings and listed in the Bid Form. Measurement and payment shall be made for the actual length of casing pipe installed and will represent full compensation for all labor, materials, excavation (including rock), dewatering, sheeting and shoring, erosion and sedimentation control, machinery, equipment, pipe spacers, backfilling and compaction, supporting and protecting of existing underground or aboveground utilities including associated utility coordination, and all other items necessary to complete this Bid Item. No additional compensation will be made for rock removal, backfill material or for repair of any trench settlement.

BID ITEM #UW-16 ELWOOD I PUMP STATION INTERCONNECTION

Payment for all work included in this Bid Item shall be at the applicable lump sum bid for the Elwood I Pump Station Interconnection as shown on the Contract Drawings and listed on the Bid Form, and include installing the deadman thrust blocks, coordinating shutdown of existing 36" PCCP transmission line with the County, shutdown and draining of existing 36" PCCP transmission line, furnishing and installing 36" uni-flange, connecting new 36" DIP water mains to existing 36" DIP water mains, connecting new 36" DIP water mains to deadman thrust blocks, concrete encasement of new 36" 90 degree bends, and grout filling the portion of existing 30" DIP water main to remain beneath existing above-ground check valve assembly. Payment shall represent full compensation for all labor, materials, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, uni-flange, concrete, reinforcing, soil anchors, pipe clamp and appurtenances, grout, connections to existing pipelines, backfill, regrading, compaction, supporting and protecting of existing underground or aboveground utilities including associated utility

coordination, equipment and all other items necessary to complete this Bid Item. No additional compensation will be made for excavation below the bottom of the pipe or deadman thrust blocks, for rock removal or bedding and backfill material, or for repair of any trench settlement. Measurement for periodic payments of this lump sum bid item will be in accordance with the approved Schedule of Values, to be supplied by the Contractor in accordance with the Contract Documents.

Pipe, fittings, valves, and pipe removal to be paid for under separate Bid Items.

Refer to Construction Phasing for work that must be performed at the same time and allowable shutdown time limits.

BID ITEM #UW-17 PIPELINE INTERCONNECTIONS

Payment for all work included in these Bid Items shall be at the applicable lump sum bid for each interconnection including furnishing and installing the pipe, fittings and valves, as shown on the Contract Drawings and listed on the Bid Form. Measurement and Payment shall be made on a lump sum basis within the respective limits of the pay item shown on the Contract Drawings and will represent full compensation for all labor, materials, tree trimming and removal if needed, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, demolition and disposal of existing pipe and appurtenances, bedding, backfill, restraining devices, thrust blocks if shown on the drawings, polywrapping, detection tape, tracer wire installation and testing, tracer wire test station box, connections to existing pipelines, backfill, regrading, compaction, hydrostatic testing, cleaning, disinfection and testing, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete these Bid Items. No additional compensation will be made for excavation below the bottom of the pipe, for rock removal or bedding and backfill material, or for repair of any trench settlement.

Restraining of existing 36" PW-PCCP (in Bid Item #UW-18A) and 30" PW-DIP (in Bid Item # UW-18B) to be paid for under separate Bid Items.

Refer to Construction Phasing for work that must be performed at the same time and allowable shutdown time limits.

BID ITEM # UW-17A 51st Street E 36-Inch Interconnection
(This interconnection shall be coordinated with Bid Item #UW-14 so that the existing 36" water main is shutdown only one time.)

BID ITEM # UW-17B 51st Street E 30-Inch Interconnection
(Include coordination with County and shutdown and drainage of existing 30" WM.)

BID ITEM # UW-17C Braden River Church Interconnection

BID ITEM #UW-18 RESTRAIN EXISTING PIPE JOINTS

Payment for all work included in these Bid Items shall be made at the applicable Contract unit price bid for restraining the existing listed diameter pipe joints as shown on the Contract Drawings and listed in the Bid Form. Payment shall represent full compensation for all labor, materials, work area clearing and grubbing, tree trimming and removal if needed, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, furnish and installing restraining devices on existing pipe, enlisting services of the PCCP pipe manufacturer (U.S. Pipe/Forterra Pressure Pipe) to remove existing mortar joint coating, weld joint, replace mortar joint coating on existing PCCP joints, backfill, compaction, regrading, maintenance of traffic (MOT), supporting and

protecting of existing underground or aboveground utilities including associated utility coordination, and all other related and necessary materials, work, and equipment required to properly restrain the existing piping.

BID ITEM #UW-18A Restrain Existing 36" PCCP Pipe Joints
BID ITEM #UW-18B Restrain Existing 30" DIP Pipe Joints
BID ITEM #UW-18C Restrain Existing 8" Pipe Joints
BID ITEM #UW-18D Restrain Existing 6" Pipe Joints
BID ITEM #UW-18E Restrain Existing 4" Pipe Joints

C. POTABLE WATER REMOVE

BID ITEM #UWR-1 REMOVE AND DISPOSE OF EXISTING PIPE

Payment for all work included in these Bid Items will be made at the applicable Contract unit price bid per linear foot for removing the listed diameter and material water mains, fittings, valves, and ARVs as shown on the Contract Drawings and listed on the Bid Form. Measurement will be horizontally, above the centerline of the pipe, and includes the length of any valves or fittings. Payment shall represent full compensation for all labor, materials, tree trimming and removal if needed, excavation, dewatering, erosion and sedimentation control, sheeting and shoring, removal and disposal of pipe, backfill, compaction, grading, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete these Bid Items.

BID ITEM #UWR-1A 36-inch PCCP
BID ITEM #UWR-1B 36-inch DIP
BID ITEM #UWR-1C 30-inch DIP
BID ITEM #UWR-1D 8-inch PVC
BID ITEM #UWR-1E 6-inch PVC
BID ITEM #UWR-1F 4-inch PVC

BID ITEM #UWR-2 REMOVE AND DISPOSE OF EXISTING THRUST BLOCK AT STA. 507+00

Payment for all work included in this Bid Item will be made at the applicable Contract unit price bid per ton for removing and disposing of the existing thrust block located at Sta 507+00 on Morgan Johnson Road as shown on the Contract Drawings and listed on the Bid Form. Measurement will be the actual weight in tons of concrete thrust block removed. Payment shall represent full compensation for all labor, materials, excavation, dewatering, erosion and sedimentation control, sheeting and shoring, removal, hauling and disposal of concrete, backfill, compaction, grading, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete this Bid Item.

BID ITEM #UWR-3 REMOVE AND DISPOSE OF TEMPORARY 6-INCH WATER MAIN

Payment for all work included in this Bid Item will be made at the applicable Contract unit price bid per linear foot for removing and disposing of the temporary 6” water main pipe on Morgan Johnson Road as shown on the Contract Drawings and listed on the Bid Form. Measurement will be horizontally, above the centerline of the pipe, and includes the length of any valves or fittings. Payment shall represent full compensation for all labor, materials, excavation, dewatering, erosion and sedimentation control, sheeting and shoring, removal and disposal of pipe, backfill, compaction, grading, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete this Bid Item.

BID ITEM #UWR-4 REMOVE AND DISPOSE OF EXISTING WATER SERVICES

Payment for all work included in this Bid Item will be made at the applicable Contract unit price bid per each existing water service removed and disposed, including existing service lines to be removed, meter box (if applicable), and backflow preventer (if applicable), as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, materials, excavation, dewatering, erosion and sedimentation control, sheeting and shoring, removal and disposal, backfill, compaction, grading, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete this Bid Item.

BID ITEM #UWR-5 REMOVE AND SALVAGE EXISTING FIRE HYDRANT ASSEMBLY

Payment for all work included in this Bid Item will be made at the applicable Contract unit price bid per each existing fire hydrant assembly removed and salvaged, including lead, gate valve, valve box, concrete pads, and thrust blocks, as shown on the Contract Drawings and listed on the Bid Form. The Contractor shall place the removed fire hydrant assembly in a location accessible to Manatee County Utility Operation staff for removal from the site. Payment shall represent full compensation for all labor, materials, excavation, dewatering, erosion and sedimentation control, sheeting and shoring, removal and disposal, backfill, compaction, grading, supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete this Bid Item.

D. WASTEWATER FORCE MAIN INSTALL

BID ITEM #UWW-1 FORCE MAIN BY OPEN CUT

Payment for all work included in these Bid Items shall be made at the applicable Contract unit price bid per the schedule of prices for furnishing and installing the listed diameter and material force main pipe and fittings as shown on the Contract Drawings and listed in the Bid Form. Measurement and Payment shall be made for the actual length of the listed diameter and material pipe installed and will represent full compensation for all labor, materials, tree trimming and removal if needed, excavation, including rock, sheeting and shoring, dewatering, erosion and sedimentation control, bedding, furnish and installing pipe, fittings, restraining devices, thrust blocks where indicated on the drawings, connections to existing pipelines, concrete encasement, detection tape, polywrapping, tracer wire installation and testing, backfill, regrading of ditches, drainage pipe and structures restoration, compaction, grading, cleaning, testing, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete these Bid Items. No additional compensation will be made for excavation below the bottom of the pipe, for rock removal or bedding and backfill material, or for repair of any trench settlement. Multiple leakage tests may be required in order to maintain service and due to utility and MOT construction Phasing.

BID ITEM #UWW-1A 10-Inch DIP PO
BID ITEM #UWW-1B 10-Inch DIP RJ
BID ITEM #UWW-1C 8-Inch DIP PO
BID ITEM #UWW-1D 8-Inch DIP RJ
BID ITEM #UWW-1E 6-Inch DIP PO
BID ITEM #UWW-1F 6-Inch DIP RJ
BID ITEM #UWW-1G 4-Inch DIP RJ
BID ITEM #UWW-1H 3-Inch DIP RJ
BID ITEM #UWW-1I 10-Inch PVC PO
BID ITEM #UWW-1J 10-Inch PVC RJ
BID ITEM #UWW-1K 8-Inch PVC PO
BID ITEM #UWW-1L 8-Inch PVC RJ
BID ITEM #UWW-1M 2-Inch PVC

BID ITEM #UWW-2 DUCTILE IRON FORCE MAIN FITTINGS

Payment for all work included in these Bid Items shall be made at the applicable Contract unit price bid per the schedule of prices for furnishing and installing the listed diameter and type reclaimed water main fittings as shown on the Contract Drawings and listed in the Bid Form. Measurement and Payment shall be made for the number of the listed diameter fittings installed and will represent full compensation for all labor, materials, tree trimming and removal as needed, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, furnish and installing pipe, restraining devices, thrust blocks where indicated on the drawings, connections to existing pipelines (except those described below in separate Bid Items), concrete encasement, detection tape, polywrapping, tracer wire installation and testing, backfill, regrading of ditches, drainage pipe and structures restoration, compaction, grading, cleaning, testing and disinfection, maintenance of traffic (MOT) if needed, supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment, and all other items necessary to complete these Bid Items. No additional compensation will be made for excavation below the bottom of the pipe, for rock removal or bedding and backfill material, or for repair of any trench settlement.

BID ITEM #UWW-2A 10-inch 45 Degree Bend
BID ITEM #UWW-2B 10-inch x 8-inch Reducer
BID ITEM #UWW-2C 10-inch x 8-inch Wye
BID ITEM #UWW-2D 10-inch x 4-inch Tee

BID ITEM #UWW-2E 8-inch 45 Degree Bend
BID ITEM #UWW-2F 8-inch 22.5 Degree Bend
BID ITEM #UWW-2G 8-inch 11.25 Degree Bend
BID ITEM #UWW-2H 8-inch x 8-inch Tee
BID ITEM #UWW-2I 8-inch x 6-inch Tee
BID ITEM #UWW-2J 8-inch Cap

BID ITEM #UWW-2K 6-inch 45 Degree Bend
BID ITEM #UWW-2L 6-inch 22.5 Degree Bend
BID ITEM #UWW-2M 6-inch 11.25 Degree Bend
BID ITEM #UWW-2N 6-inch Cap

BID ITEM #UWW-2O 4-inch 90 Degree Bend
BID ITEM #UWW-2P 4-inch 45 Degree Bend
BID ITEM #UWW-2Q 4-inch x 3-inch Reducer
BID ITEM #UWW-2R 4-inch Cap

BID ITEM #UWW-2S 3-inch 90 Degree Bend

BID ITEM #UWW-3 8-INCH DIP DRY FORCE MAIN ON NEW BRIDGE

Payment for all work included in these Bid Items shall be made at the applicable Contract bid prices for furnishing and installing the 8-inch diameter DIP force main pipe, fittings, and supports on the new 44th Avenue East Bridge over the Braden River as shown on the Contract Drawings and listed in the Bid Form. Measurement and Payment shall be made on an individual bid price basis within the respective limits of the pay items shown below and will represent full compensation for all labor, materials, erosion and sedimentation control, furnishing and installing pipe, fittings, expansion joints, combination air valve and accessories, pipe supports, pipe straps, coatings, restraining devices, thrust blocks where indicated on the drawings, cleaning, testing, equipment and all other items necessary to complete these Bid Items. The listing below provides a breakdown of pay items for the major components of work associated with the installation of the 8-inch diameter DIP force main on the new bridge. Prior to submitting an invoice for work performed, the contractor shall

submit to the engineer for approval a detailed accounting of all work to be performed with each bid item. All work associated with installing the 8-inch force main on the bridge must be accounted for within pay items UWW-2A through UWW-2D.

BID ITEM #UWW-3A 8-inch DIP/RJ	Pay item per linear foot of pipe installed
BID ITEM #UWW-3B 8-inch Expansion Joint	Pay item per each expansion joint installed
BID ITEM #UWW-3C Combination Air Valve	Pay item per each valve installed
BID ITEM #UWW-3D 8-inch Pipe Supports	Pay item per each pipe support installed

BID ITEM #UWW-4 2-INCH HDPE FORCE MAIN BY HDD

Payment for all work included in this Bid Item shall be made at the applicable contract unit price bid for furnishing and installing 2-inch diameter HDPE pipe via horizontal directional drilling (HDD) as shown on the Contract Drawings and listed in the Bid Form. Measurement and payment shall be made for the actual length of HDPE pipe installed as measured horizontally above the centerline of the pipe and will represent full compensation for all labor, materials, excavation (including rock), dewatering, bracing, sheeting and shoring, exploratory pits, launching and receiving pits, machinery, construction equipment, directional boring equipment, drilling fluids, fittings, joints and jointing materials, HDPE to PVC transition, tracer wire installation and testing, disposal of spoil and drilling fluids, boring path report, bedding, backfilling, compaction, regrading, cleaning, hydrostatic testing, drainage, erosion and sedimentation control, drilling fluid release monitoring and cleanup, supporting and protecting of existing underground or aboveground utilities including associated utility coordination, and all other items necessary to complete this Bid Item.

BID ITEM #UWW-5 GATE VALVE

Payment for all work included in these Bid Items shall be made at the applicable Contract unit price bid per each valve for furnishing and installing the listed diameter valve, box, cover, tag, tracer wire and test station box, and concrete pad as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, material, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, backfill, compaction, cleaning, testing, testing of tracer wire, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete these Bid Items.

BID ITEM #UWW-5A	8-Inch Gate Valve
BID ITEM #UWW-5B	6-Inch Gate Valve
BID ITEM #UWW-5C	4-Inch Gate Valve

BID ITEM #UWW-6 8-INCH FORCE MAIN BYPASS ASSEMBLY

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid per each bypass assembly for furnishing and installing the pipe, fittings, restraining devices, plug valve, valve box, concrete pad, cover, tag, tracer wire and test station box, and concrete pad as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, material, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, backfill, compaction, cleaning, testing, testing of tracer wire, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete this Bid Item.

BID ITEM #UWW-7 8-INCH FORCE MAIN PIGGING PORT ASSEMBLY

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid per each pigging port assembly for furnishing and installing the pipe, fittings, plug valve, restraining devices, valve box, concrete pad, cover, tag, tracer wire and test station box, and concrete pad as shown on the Contract Drawings and listed on the Bid Form. Payment shall

represent full compensation for all labor, material, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, backfill, compaction, cleaning, testing, testing of tracer wire, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete this Bid Item.

BID ITEM #UWW-8 8-INCH FORCE MAIN CHECK VALVE ASSEMBLY

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid per each check valve assembly for furnishing and installing the pipe, fittings, check valve, plug valves, restraining devices, boxes, covers, tags, vault, hatch, tracer wire and test station boxes, and concrete pads as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, material, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, backfill, compaction, cleaning, testing, testing of tracer wire, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete this Bid Item.

BID ITEM #UWW-9 AIR RELEASE VALVES

Payment for all work included in these Bid Items shall be made at the applicable contract unit price bid for furnishing and installing the listed size and type air release valve assembly including the vent pipe, valves, concrete pads, cabinet, concrete manhole, manhole frame and cover, and tracer wire and test box, as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, material, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, backfill, compaction, cleaning, testing, testing of tracer wire, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete these Bid Items.

BID ITEM #UWW-9A Above Ground Air Release Valve
BID ITEM #UWW-9B Below Grade Air Release Valve

BID ITEM #UWW-10 TAPPING SLEEVE AND VALVE

Payment for all work included in these Bid Items shall be made at the applicable contract unit price bid for furnishing and installing the listed size tapping sleeve and valve including the tapping sleeve, valve, valve box, restraint, concrete pad, and tracer wire and test box as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, material, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, backfill, compaction, cleaning, testing, testing of tracer wire, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete these Bid Items.

BID ITEM #UWW-10A 20'' x 10'' Tapping Sleeve and Valve
BID ITEM #UWW-10B 20'' x 4'' Tapping Sleeve and Valve

BID ITEM #UWW-11 CAP 8-INCH FORCE MAIN AT OLD CARUSO ROAD

Payment for all work included under this Bid Item will be made at the applicable lump sum bid price for capping the existing 8" force main at Old Caruso Road (approximately Sta 232+00) including furnishing and installing line stop, cap, and pipe restraint, as shown on the Contract Drawings and listed on the Bid Form. Measurement and Payment shall be made on a lump sum basis within the respective limits of the pay item shown on the Contract Drawings and will represent full compensation for all labor, materials, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, cutting existing pipe, bedding, backfill, regrading,

compaction, sodding, maintenance of traffic (MOT) (if required), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete this Bid Item.

BID ITEM #UWW-12 OFFSET EXISTING 20-INCH DIP FORCE MAIN

Some of the new drainage structures on 44th Avenue East will be installed close to the existing 20-inch DIP force main. Based on exploratory field work during design, there should be adequate clearance. However, in the event that a conflict is found during construction, this pay item and associated detail in the plans will be used for compensation for the offset performed. Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid per each force main offset as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, materials, tree trimming and removal if needed, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, furnishing and installing pipe and fittings, connection to existing piping, pipe restraints, ARV, line stops and temporary bypass line, backfill, compaction, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete this Bid Item.

BID ITEM #UWW-13 CONCRETE ENCASEMENT OF EXISTING 20-INCH DIP FORCE MAIN

The existing grade over the existing 20-inch DIP force main may be reduced to less than 36 inches at the proposed back of sidewalk drainage structures. In the event that the cover is reduced to less than 36 inches during construction, this pay item and associated detail in the plans will be used for compensation for the encasement. Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid per each force main encasement as shown on the Contract Drawings and listed on the Bid Form.Payment shall represent full compensation for all labor, materials, tree trimming and removal if needed, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, concrete, wire reinforcement, backfill, compaction, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete this Bid Item.

BID ITEM #UWW-14 RESET MANHOLE FRAME AND COVER

At approximately Sta 916+20, the existing manhole containing a below grade ARV for the 20-inch force main will require adjusting the elevation of the frame and cover due to construction of the Caruso Road Ramp. Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid per each reset manhole frame and cover including furnishing and installing brick shims or precast concrete ring (as required), installed as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, materials, excavation, dewatering, erosion and sedimentation control, backfill, compaction, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete this Bid Item.

BID ITEM #UWW-15 GRINDER LIFT STATION AT ELWOOD I PS

Payment for all work included under this Bid Item shall represent full compensation in accordance with the lump sum price bid for the construction of the grinder lift station at Elwood I PS, including connection to the existing sanitary line, as shown on the Contract Drawings and/or called for in the Contract Specifications, ready for approval and acceptance by the County. Payment shall represent full compensation for all labor, materials, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, concrete, backfill, compaction, regrading, wet well, valve vault, hatch covers, piping, valves, wastewater pumps, controls, wiring, Data Flow Telemetry System, hose bib, back flow preventer, supporting and protecting of existing underground or aboveground utilities including associated utility coordination, and all other materials and equipment necessary for a complete and fully operable system, including testing and

start-up. No additional compensation will be made for excavation below the bottom of the pipe, for rock removal or bedding and backfill material, or for repair of any trench settlement. The lump sum price shall also include any off-site material required to establish finish grade and the removal and off-site disposal of any unsuitable excavated material or debris. Measurement for periodic payments of this lump sum bid item will be in accordance with the approved Schedule of Values, to be supplied by the Contractor in accordance with the Contract Documents.

BID ITEM #UWW-16 RESTRAIN EXISTING PIPE JOINTS

Payment for all work included in these Bid Items shall be made at the applicable Contract unit price bid for restraining the existing listed diameter pipe joints as shown on the Contract Drawings and listed in the Bid Form. Payment shall represent full compensation for all labor, materials, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, furnish and installing restraining devices on existing pipe, backfill, compaction, regrading, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, and all other related and necessary materials, work, and equipment required to properly restrain the existing piping.

BID ITEM #UWW-16A Restrain Existing 8-inch Pipe Joints
BID ITEM #UWW-16B Restrain Existing 3-inch Pipe Joints

E. WASTEWATER GRAVITY SEWER INSTALL

BID ITEM #UWW-17 CONNECT TO EXISTING MANHOLE

Payment for all work included in these Bid Items shall be made at the applicable Contract unit price bid per each connection to existing sanitary manholes, including cutting the manhole, sealing the new penetration and cutting a new flow channel, as shown on the Contract Drawings and listed in the Bid Form. Payment shall represent full compensation for all labor, materials, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, concrete work, backfill, compaction, grading, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete these Bid Items.

BID ITEM # UWW-17A 8-inch Sanitary Connection
BID ITEM # UWW-17B 2-inch Force Main Connection

BID ITEM #UWW-18 8-INCH PVC GRAVITY SEWER PIPE BY OPEN CUT

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid per the schedule of prices for furnishing and installing the listed diameter gravity sewer pipe as shown on the Contract Drawings and listed in the Bid Form. Measurement and Payment shall be made for the actual length of the listed diameter pipe installed and will represent full compensation for all labor, materials, tree trimming and removal if needed, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, furnish and installing pipe, fittings, joints and jointing materials, connecting to new manhole, couplings, backfill, compaction, grading, regrading of ditches, drainage pipe and structures restoration, cleaning, testing of gravity sewer pipes, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete this Bid Item. No additional compensation will be made for excavation below the bottom of the pipe, for rock removal or bedding and backfill material, or for repair of any trench settlement.

BID ITEM #UWW-19 SANITARY SEWER MANHOLE AND COVER

Payment for work under this Bid Item shall be made at the Contract unit price bid for each manhole furnished and installed including frame and cover, manhole base slab, fittings, manhole penetration

couplings, pipe benches, rainwater protector, protective lining, drop pipes and pipe supports, as shown on the Contract Drawings and listed in the Bid Form. Payment shall represent full compensation for all labor, materials, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, construction of invert, sealing of lift holes, backfill, compaction, grading, maintenance of traffic (MOT), testing, supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete this Bid Item.

BID ITEM #UWW-20 APPLY SPRAY LINER TO EXISTING MANHOLE

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid per each existing manhole to have protective spray liner applied, as shown on the Contract Drawings and listed in the Bid Form. Payment shall represent full compensation for all labor, materials, cleaning, repairs, blocking/diversion of sewer flow, protection of existing piping, and equipment and all other items necessary to complete this Bid Item.

F. WASTEWATER REMOVE

BID ITEM #UWWR-1 REMOVE AND DISPOSE OF EXISTING FORCE MAIN

Payment for all work included in these Bid Items will be made at the applicable Contract unit price bid per linear foot for removing the listed diameter and material force mains as shown on the Contract Drawings and listed on the Bid Form. Measurement will be horizontally, above the centerline of the pipe, and includes the length of any valves or fittings. Payment shall represent full compensation for all labor, materials, tree trimming and removal if needed, excavation, dewatering, erosion and sedimentation control, sheeting and shoring, removal and disposal of pipe, fittings and valves, backfill, compaction, grading, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete these Bid Items.

BID ITEM #UWWR-1A 8-Inch PVC
BID ITEM #UWWR-1B 6-Inch PVC
BID ITEM #UWWR-1C 3-Inch PVC

BID ITEM #UWWR-2 REMOVE AND DISPOSE OF MANHOLE WITH CHECK VALVE AND ARV

At approximately Sta 230+60, the manhole containing the force main check valve and ARV is to be removed. Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid per each manhole removed and disposed as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, materials, excavation, dewatering, erosion and sedimentation control, sheeting and shoring, removal and disposal of manhole, backfill, compaction, grading, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete this Bid Item.

BID ITEM #UWWR-3 REMOVE AND DISPOSE OF SEPTIC SYSTEM AT ELWOOD I PUMP STATION

Payment for all work included in this Bid Item shall be made at the applicable contract lump sum bid price for removing and disposing of the existing septic tank and drain field system at Elwood I PS, including the sanitary line, septic tank, splitter box, and drain field and replacement of drain field area with select backfill as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all County Health Department permitting and fees, labor, materials, excavation, dewatering, erosion and sedimentation control, sheeting and shoring, removal and disposal, backfill, compaction, grading, supporting and equipment and all other items necessary to complete this Bid Item.

G. RECLAIMED WATER INSTALL

BID ITEM #URW-1 RECLAIMED WATER MAIN BY OPEN CUT

Payment for all work included in these Bid Items shall be made at the applicable Contract unit price bid per the schedule of prices for furnishing and installing the listed diameter DIP reclaimed water main pipe and fittings as shown on the Contract Drawings and listed in the Bid Form. Measurement and Payment shall be made for the actual length of the listed diameter pipe installed and will represent full compensation for all labor, materials, tree trimming and removal if needed, excavation, including rock, sheeting and shoring, dewatering, erosion and sedimentation control, bedding, furnish and installing pipe, fittings, restraining devices, thrust blocks where indicated on the drawings, connection to existing piping, concrete encasement, detection tape, polywrapping, tracer wire installation and testing, backfill, regrading of ditches, drainage pipe and structures restoration, compaction, grading, cleaning, testing, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete these Bid Items. No additional compensation will be made for excavation below the bottom of the pipe, for rock removal or bedding and backfill material, or for repair of any trench settlement. Multiple pressure tests may be required in order to maintain service and due to utility and MOT construction Phasing.

BID ITEM #URW-1A 12-inch DIP RJ
BID ITEM #URW-1B 8-inch DIP RJ
BID ITEM #URW-1C 6-inch DIP RJ

BID ITEM #URW-2 DUCTILE IRON RECLAIMED WATER MAIN FITTINGS

Payment for all work included in these Bid Items shall be made at the applicable Contract unit price bid per the schedule of prices for furnishing and installing the listed diameter and type reclaimed water main fittings as shown on the Contract Drawings and listed in the Bid Form. Measurement and Payment shall be made for the number of the listed diameter fittings installed and will represent full compensation for all labor, materials, tree trimming and removal as needed, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, furnish and installing pipe, restraining devices, thrust blocks where indicated on the drawings, connections to existing pipelines (except those described below in separate Bid Items), concrete encasement, detection tape, polywrapping, tracer wire installation and testing, backfill, regrading of ditches, drainage pipe and structures restoration, compaction, grading, cleaning, testing and disinfection, maintenance of traffic (MOT) if needed, supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment, and all other items necessary to complete these Bid Items. No additional compensation will be made for excavation below the bottom of the pipe, for rock removal or bedding and backfill material, or for repair of any trench settlement.

BID ITEM #URW-2A 12-inch 45 Degree Bend
BID ITEM #URW-2B 12-inch x 6-inch Reducer
BID ITEM #URW-2C 12-inch x 12-inch Tee
BID ITEM #URW-2D 12-inch Cap

BID ITEM #URW-2E 8-inch 45 Degree Bend
BID ITEM #URW-2F 8-inch Cap

BID ITEM #UW-2G 6-inch 45 Degree Bend
BID ITEM #UW-2H 6-inch Cap

BID ITEM #URW-3 GATE VALVE

Payment for all work included in these Bid Items shall be made at the applicable Contract unit price bid per each valve for furnishing and installing the listed diameter valve, box, cover, tag, tracer wire and test station box, and concrete pad as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, material, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, backfill, compaction, cleaning, testing, testing of tracer wire, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete these Bid Items.

BID ITEM #URW-3A 12-inch Gate Valve
BID ITEM #URW-3B 6-inch Gate Valve

BID ITEM #URW-4 RECLAIMED WATER FIRE HYDRANT ASSEMBLY

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid per each reclaimed water fire hydrant assembly, including 36" x 6" tapping sleeve and valve to connect to existing reclaimed water main, hydrant lead, gate valve, box cover, concrete pads, tracer wire installation and testing, tracer wire and test station box, restraining rods and/or thrust blocks, as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, materials, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, bedding, backfill, polyethylene encasement, compaction, testing and disinfection, tracer wire testing, supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete this Bid Item.

BID ITEM #URW-5 – RECLAIMED WATER SERVICES

Payment for all work included in these Bid Items shall be made at the applicable Contract unit price bid per each reclaimed water service type for furnishing and installing the listed individual water service line and meter box (where applicable), removing and reinstalling the existing reclaimed water meter (where applicable), connecting the new service lines to the existing service lines, and temporary relocation of existing service lines (if necessary) for construction of new utilities, as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, material, excavation, including rock, dewatering, erosion and sedimentation control, sheeting and shoring, tracer wire installation and testing, directional drilling, connections to existing pipelines, bedding, backfill, compaction, cleaning, testing, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete these Bid Items. This activity shall be coordinated with the private property owner to ensure minimum interruption of potable water service.

BID ITEM #URW-5A Single RW Service - Replace Service Line
BID ITEM #URW-5B Single RW Service - Replace Service Line & Meter Box Assembly
BID ITEM #URW-5C Double RW Service - Replace Service Line
BID ITEM #URW-5D Double RW Service - Replace Service Line & Meter Box Assembly

H. RECLAIMED WATER REMOVE

BID ITEM #URWR-1 REMOVE AND DISPOSE OF EXISTING RECLAIMED WATER SERVICES

Payment for all work included in this Bid Item will be made at the applicable Contract unit price bid per each existing reclaimed water service (single or double) removed and disposed, including existing service lines to be removed and meter box (if applicable) as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor,

materials, excavation, dewatering, erosion and sedimentation control, sheeting and shoring, removal and disposal, backfill, compaction, grading, maintenance of traffic (MOT), supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete this Bid Item.

BID ITEM #URWR-2 REMOVE AND SALVAGE EXISTING RECLAIMED WATER FHA

Payment for all work included in this Bid Item will be made at the applicable Contract unit price bid per each existing reclaimed water fire hydrant assembly removed and salvaged, including lead, gate valve, valve box, concrete pads, and thrust blocks, as shown on the Contract Drawings and listed on the Bid Form. The Contractor shall place the removed fire hydrant assembly in a location accessible to Manatee County Utility Operation staff for removal from the site. Payment shall represent full compensation for all labor, materials, excavation, dewatering, erosion and sedimentation control, sheeting and shoring, removal and disposal, backfill, compaction, grading, supporting and protecting of existing underground or aboveground utilities including associated utility coordination, equipment and all other items necessary to complete this Bid Item.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01340 SHOP DRAWINGS, PROJECT DATA AND SAMPLES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall submit to the County for review and approval: working drawings, shop drawings, test reports and data on materials and equipment (hereinafter in this section called data) that have been produced within the last three (3) years, and material samples (hereinafter in this section called samples) as are required for the proper control of work, including, but not limited to those working drawings, shop drawings, data and samples for materials and equipment specified elsewhere in the Specifications and in the Contract Drawings. Submittals may be done electronically via PDF documents.

B. The Contractor is to maintain an accurate updated submittal log and will bring this log to each scheduled progress meeting with the County. The County will provide the initial submittal log in electronic format. The electronic log (excel file) shall be passed back and forth between the Contractor and the County for each submittal package. This log should include the following items:

1. Submittal description and number assigned.
2. Date to County.
3. Date returned to Contractor (from County).
4. Status of Submittal (No exceptions taken, returned for confirmation or resubmittal, rejected).
5. Date of Resubmittal and Return (as applicable).
6. Date material released (for fabrication).
7. Projected date of fabrication.
8. Projected date of delivery to site.
9. Projected date and required lead time so that product installation does not delay contact.
10. Status of O&M manuals submitted.

1.03 CONTRACTOR'S RESPONSIBILITY

A. It is the duty of the Contractor to check all drawings, data and samples prepared by or for him before submitting them to the County for review. Each and every copy of the Drawings and data shall bear Contractor's stamp showing that they have been so checked. Shop drawings submitted to the County without the Contractor's stamp will be returned to the Contractor for conformance with this requirement. Shop drawings shall indicate any deviations in the submittal from requirements of the contract Documents.

B. The Contractor shall ensure that all submitted cut sheets, product sheets, product documentation, etc. are current versions of the product information and are not older than three (3) years. Product certification(s) shall be no older than three (3) years. Any submitted documents found to be beyond the acceptable date ranges shall be rejected.

C. Determine and verify:

1. Field measurements.
2. Field construction criteria.
3. Catalog numbers and similar data.
4. Conformance with Specifications and indicate all variances from the Specifications.

~~C~~D. The Contractor shall furnish the County a schedule of Shop Drawing submittals fixing the respective dates for the submission of shop and working drawings, the beginning of manufacture, testing and installation of materials, supplies and equipment. This schedule shall indicate those that are critical to the progress schedule.

~~D~~E. The Contractor shall not begin any of the work covered by a drawing, data, or a sample returned for correction until a revision or correction thereof has been reviewed and returned to him, by the County, with No Exceptions Taken or Approved As Noted.

~~E~~F. The Contractor shall submit to the County all drawings and schedules sufficiently in advance of construction requirements to provide no less than twenty-one (21) calendar days for checking and appropriate action from the time the County receives them. Submittals are to be scheduled, submitted, reviewed, and approved prior to the acquisition of the material or equipment. Coordinate scheduling, sequencing, preparing, and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow time for potential resubmittal.

~~F~~G. No delay costs or time extensions will be allowed for time lost in late submittals or resubmittals.

H. All material & product submittals, other than samples, may be transmitted electronically as a pdf file. All returns to the contractor will be as a pdf file only unless specifically requested otherwise.

~~G~~I. The Contractor shall be responsible for and bear all cost of damages which may result from the ordering of any material or from proceeding with any part of work prior to the completion of the review by County of the necessary Shop Drawings.

1.04 COUNTY'S REVIEW OF SHOP DRAWINGS AND WORKING DRAWINGS

A. The County's review of drawings, data and samples submitted by the Contractor shall cover only general conformity to the Specifications, external connections and dimensions which affect the installation.

B. The review of drawings and schedules shall be general and shall not be construed:

1. As permitting any departure from the Contract requirements.
2. As relieving the Contractor of responsibility for any errors, including details, dimensions and materials.
3. As approving departures from details furnished by the County, except as otherwise provided herein.

C. If the drawings or schedules as submitted describe variations and show a departure from the Contract requirements which the County finds to be in the interest of the County and to be so minor as not to involve a change in Contract Price or time for performance, the County may return the reviewed drawings without noting any exception.

D. When reviewed by the County, each of the Shop and Working Drawings shall be identified as having received such review being so stamped and dated. Shop Drawings stamped "REJECTED" and with required corrections shown shall be returned to the Contractor for correction and resubmittal.

E. Resubmittals will be handled in the same manner as first submittals. On resubmittals, the Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, to revisions other than the corrections requested by the County on previous submissions. The Contractor shall make any corrections required by the County.

F. If the Contractor considers any correction indicated on the drawings to constitute a change to the Contract Drawings or Specifications, the Contractor shall give written notice thereof to the County.

G. The County shall review a submittal/resubmittal a maximum of three (3) times after which cost of review shall be borne by the Contractor. The cost of engineering shall be equal to the County's actual payroll cost.

H. When the Shop and Working Drawings have been completed to the satisfaction of the County, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the County.

I. No partial submittals shall be reviewed. Incomplete submittals shall be returned to the Contractor and shall be considered not approved until resubmitted.

1.05 SHOP DRAWINGS

A. When used in the Contract Documents, the term "Shop Drawings" shall be considered to mean Contractor's plans for material and equipment which become an integral part of the Project. These drawings shall be complete and detailed. Shop Drawings shall consist of fabrication, drawings, setting drawings, schedule drawings, manufacturer's scale drawings and wiring and control diagrams. Cuts, catalogs, pamphlets, descriptive literature and performance and test data, shall be considered only as supportive to required Shop Drawings as defined above.

B. Drawings and schedules shall be checked and coordinated with the work of all trades involved, before they are submitted for review by the County and shall bear the Contractor's stamp of approval and original signature as evidence of such checking and coordination. Drawings or schedules submitted without this stamp of approval and original signature shall be returned to the Contractor for resubmission.

C. Each Shop Drawing shall have a blank area 3-1/2 inches by 3-1/2 inches, located adjacent to the title block. The title block shall display the following:

1. Number and title of the drawing.
2. Date of Drawing or revision.
3. Name of project building or facility.
4. Name of contractor and subcontractor submitting drawing.
5. Clear identification of contents and location of the work.
6. Specification title and number.

D. If drawings show variations from Contract requirements because of standard shop practice or for other reasons, the Contractor shall describe such variations in his letter of transmittal. If acceptable, proper adjustment in the contract shall be implemented where appropriate. If the Contractor fails to describe such variations, he shall not be relieved of the responsibility of executing the work in accordance with the Contract, even though such drawings have been reviewed.

E. Data on materials and equipment shall include, without limitation, materials and equipment lists, catalog sheets, cuts, performance curves, diagrams, materials of construction and similar descriptive material. Materials and equipment lists shall give, for each item thereon, the name and location of the supplier or manufacturer, trade name, catalog reference, size, finish and all other pertinent data.

F. For all mechanical and electrical equipment furnished, the Contractor shall provide a list including the equipment name and address and telephone number of the manufacturer's representative and service company so that service and/or spare parts can be readily obtained.

G. All manufacturers or equipment suppliers who proposed to furnish equipment or products shall submit an installation list to the County along with the required shop drawings. The installation list shall include at least five installations where identical equipment has been installed and have been in operation for a period of at least one (1) year.

H. Only the County will utilize the color "red" in marking shop drawing submittals.

1.06 SUBMITTAL PREPARATION

A. Each submittal is to be complete and in sufficient detail to allow ready determination of compliance with contract requirements.

B. Collect required data for each specific material, product, unit of work, or system into a single submittal. Prominently mark choices, options, and portions applicable to the submittal. Partial submittals will not be accepted for expedition of construction effort. Submittal will be returned without review if incomplete.

C. If available product data is incomplete, provide Contractor-prepared documentation to supplement product data and satisfy submittal requirements.

D. All irrelevant or unnecessary data shall be removed from the submittal to facilitate accuracy and timely processing. Submittals that contain the excessive amount of irrelevant or unnecessary data will be returned with review.

E. Provide a transmittal form for each submittal with the following information:

1. Project title, location and number.
2. Construction contract number.
3. Date of the drawings and revisions.
4. Name, address, and telephone number of subcontractor, supplier, manufacturer, and any other subcontractor associated with the submittal.
5. List paragraph number of the specification section and page number; and sheet number of the contract drawings by which the submittal is required.
6. When a resubmission, the resubmittal document name shall remain the same, but shall add an alphabetic suffix on submittal description. For example, submittal 18 would become 18A, to indicate resubmission.
7. Product identification and location in project.

F. The Contractor is responsible for reviewing and certifying that all submittals are in compliance with contract requirements before submitting to the County for review.

G. Stamp, sign, and date each submittal transmittal form indicating action taken.

H. Stamp used by the Contractor on the submittal transmittal form to certify that the submittal meets contract requirements is to be similar to the following:

CONTRACTOR
(Firm Name)

_____ Approved

_____ Approved with corrections as noted on submittal data and/or attached sheet(s).

I certify that the following document and information has been verified to be is not more than three (3) years old.

SIGNATURE:_____

TITLE:_____

DATE:_____

1.07 WORKING DRAWINGS

A. When used in the Contract Documents, the term "working drawings" shall be considered to mean the Contractor's fabrication and erection drawings for structures such as roof trusses, steelwork, precast concrete elements, bulkheads, support of open cut excavation, support of utilities, groundwater control systems, forming and false work; underpinning; and for such other work as may be required for construction of the project.

B. Copies of working drawings as noted above, shall be submitted to the County where required by the Contract Documents or requested by the County and shall be submitted at least thirty (30) days (unless otherwise specified by the County) in advance of their being required for work.

C. Working drawings shall be signed by a registered Professional Engineer, currently licensed to practice in the State of Florida and shall convey, or be accompanied by, calculation or other sufficient information to completely explain the structure, machine, or system described and its intended manner of use. Prior to commencing such work, working drawings must have been reviewed without specific exceptions by the County, which review will be for general conformance and will not relieve the Contractor in any way from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error are assumed by the Contractor; the County and Engineer shall not have responsibility therefor.

1.07 SAMPLES

A. The Contractor shall furnish, for the review of the County, samples required by the Contract Documents or requested by the County. Samples shall be delivered to the County as specified or directed. The Contractor shall prepay all shipping charges on samples. Materials or equipment for which samples are required shall not be used in work until reviewed by the County.

B. Samples shall be of sufficient size and quantity to clearly illustrate:

1. Functional characteristics of the product, with integrally related parts and attachment devices.

2. Full range of color, texture and pattern.
3. A minimum of two samples of each item shall be submitted.

C. Each sample shall have a label indicating:

1. Name of product.
2. Name of Contractor and Subcontractor.
3. Material or equipment represented.
4. Place of origin.
5. Name of Producer and Brand (if any).
6. Location in project.
   (Samples of finished materials shall have additional markings that will identify them under the finished schedules.)
7. Reference specification paragraph.

D. The Contractor shall prepare a transmittal letter in triplicate for each shipment of samples containing the information required above. He shall enclose a copy of this letter with the shipment and send a copy of this letter to the County. Review of a sample shall be only for the characteristics or use named in such and shall not be construed to change or modify any Contract requirements.

E. Reviewed samples not destroyed in testing shall be sent to the County or stored at the site of the work. Reviewed samples of the hardware in good condition will be marked for identification and may be used in the work. Materials and equipment incorporated in work shall match the reviewed samples. If requested at the time of submission, samples which failed testing or were rejected shall be returned to the Contractor at his expense.

1.09 APPROVED SUBMITTALS

A. County approval of submittals is not to be construed as a complete check, and indicates only that the general method of construction, materials, detailing, and other information are satisfactory.

B. County approval of a submittal does not relieve the Contractor of the responsibility for any error which may exist. The Contractor is responsible for fully complying with all contract requirements and the satisfactory construction of all work, including the need to check, confirm, and coordinate the work of all subcontractors for the project. Non-compliant material incorporated in the work will be removed and replaced at the Contractor's expense.

C. After submittals have been approved, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

D. Retain a copy of all approved submittals at project site, including approved samples.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01370 SCHEDULE OF VALUES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall submit to the County a Schedule of Values allocated to the various portions of the work, within 10 days after date of Notice to Proceed.

B. Upon request of the County, the Contractor shall support the values with data which will substantiate their correctness.

C. The Schedule of Values shall be used only as the basis for the Contractor's Applications for Payment.

1.02 FORM AND CONTENT OF SCHEDULE OF VALUES

A. Schedule of Values will be considered for approval by County upon Contractor's request. Identify schedule with:

1. Title of Project and location.
2. Project number.
3. Name and address of Contractor.
4. Contract designation.
5. Date of submission.

B. Schedule of Values shall list the installed value of the component parts of the work in sufficient detail to serve as a basis for computing values for progress payments during construction.

C. Follow the table of contents for the Contract Document as the format for listing component items for structures:

1. Identify each line item with the number and title of the respective major section of the specification.
2. For each line item, list sub values of major products or operations under item.

D. Follow the bid sheets included in this Contract Documents as the format for listing component items for pipe lines.

E. The sum of all values listed in the schedule shall equal the total Contract sum.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01620 STORAGE AND PROTECTION

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

Provide secure storage and protection for products to be incorporated into the work and maintenance and protection for products after installation and until completion of Work.

1.02 STORAGE

A. Store products immediately on delivery and protect until installed in the Work, in accord with manufacturer's instructions, with seals and labels intact and legible.

B. Exterior Storage

1. Provide substantial platform, blocking or skids to support fabricated products above ground to prevent soiling or staining.
   a. Cover products, subject to discoloration or deterioration from exposure to the elements, with impervious sheet coverings. Provide adequate ventilation to avoid condensation.
   b. Prevent mixing of refuse or chemically injurious materials or liquids.

A. Arrange storage in manner to provide easy access for inspection.

1.03 MAINTENANCE OF STORAGE

A. Maintain periodic system of inspection of stored products on scheduled basis to assure that:

1. State of storage facilities is adequate to provide required conditions.
2. Required environmental conditions are maintained on continuing basis.
3. Surfaces of products exposed to elements are not adversely affected. Any weathering of products, coatings and finishes is not acceptable under requirements of these Contract Documents.

B. Mechanical and electrical equipment which requires servicing during long term storage shall have complete manufacturer's instructions for servicing accompanying each item, with notice of enclosed instructions shown on exterior of package.

1. Equipment shall not be shipped until approved by the County. The intent of this requirement is to reduce on-site storage time prior to installation and/or operation. Under no circumstances shall equipment be delivered to the site more than one month prior to installation without written authorization from the County.
2. All equipment having moving parts such as gears, electric motors, etc. and/or instruments shall be stored in a temperature and humidity controlled building approved by the County until such time as the equipment is to be installed.
3. All equipment shall be stored fully lubricated with oil, grease, etc. unless otherwise instructed by the manufacturer.
4. Moving parts shall be rotated a minimum of once weekly to insure proper lubrication and to avoid metal-to-metal "welding". Upon installation of the equipment, the Contractor shall start the equipment, at least half load, once weekly for an adequate period of time to insure that the equipment does not deteriorate from lack of use.
5. Lubricants shall be changed upon completion of installation and as frequently as

required, thereafter during the period between installation and acceptance.

6. Prior to acceptance of the equipment, the Contractor shall have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by the long storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the manufacturer to be in a condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the manufacturer will guaranty the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the Contractor's expense.

1.04 PROTECTION AFTER INSTALLATION

A. Provide protection of installed products to prevent damage from subsequent operations. Remove when no longer needed, prior to completion of work.

B. Control traffic to prevent damage to equipment and surfaces.

C. Provide coverings to protect finished surfaces from damage.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01720 PROJECT RECORD DOCUMENTS

PART 1 STANDARDS

1.01 MINIMUM RECORD DRAWING STANDARDS FOR ALL RECORD DRAWINGS SUBMITTED TO MANATEE COUNTY

A. Record drawings shall be submitted to at least the level of detail in the contract documents. It is anticipated that the original contract documents shall serve as at least a background for all record information. Original drawings in CAD format may be requested of the County.

B. Drawings shall meet the criteria of paragraph 2.04 D above and as mentioned in Section 1.14 Record Drawings in the Manatee County Public Works Standards, Part I Utilities Standards Manual approved June 2015.

PART 2 STANDARDS

2.01 REQUIREMENTS INCLUDED

A. Contractor shall maintain at the site for the County one record copy of:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. County's field orders or written instructions.
6. Approved shop drawings, working drawings and samples.
7. Field test records.
8. Construction photographs.

2.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store documents and samples in Contractor's field office apart from documents used for construction.

1. Provide files and racks for storage of documents.
2. Provide locked cabinet or secure storage space for storage of samples.

B. File documents and samples in accordance with CSI format.

C. Maintain documents in a clean, dry, legible, condition and in good order. Do not use record documents for construction purposes.

D. Make documents and samples available at all times for inspection by the County.

2.03 MARKING DEVICES

A. Provide felt tip marking pens for recording information in the color code designated by the County.

2.04 RECORDING DRAWINGS PREPARATION

A. Record information concurrently with construction progress.

B. Do not conceal any work until required information is recorded.

C. Drawings; Legibly mark to record actual construction:

1. All underground piping with elevations and dimensions. Changes to piping location. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Actual installed pipe material, class, etc. Locations of drainage ditches, swales, water lines and force mains shall be shown every 200 feet (measured along the centerline) or alternate lot lines, whichever is closer. Dimensions at these locations shall indicate distance from centerline of right-of-way to the facility.
2. Field changes of dimension and detail.
3. Changes made by Field Order or by Change Order.
4. Details not on original contract drawings.
5. Equipment and piping relocations.
6. Locations of all valves, fire hydrants, manholes, water and sewer services, water and force main fittings, underdrain cleanouts, catch basins, junction boxes and any other structures located in the right-of-way or easement, shall be located by elevation and by station and offset based on intersection P.I.'s and centerline of right-of-way. For facilities located on private roads, the dimensioning shall be from centerline of paving or another readily visible baseline.
7. Elevations shall be provided for all manhole rim and inverts; junction box rim and inverts; catch basin rim and inverts; and baffle, weir and invert elevations in control structures. Elevations shall also be provided at the PVI's and at every other lot line or 200 feet, whichever is less, of drainage swales and ditches. Bench marks and elevation datum shall be indicated.
8. Slopes for pipes and ditches shall be recalculated, based on actual field measured distances, elevations, pipe sizes, and type shown. Cross section of drainage ditches and swales shall be verified.
9. Centerline of roads shall be tied to right-of-way lines. Elevation of roadway centerline shall be given at PVI's and at all intersections.
10. Record drawings shall show bearings and distances for all right-of-way and easement lines, and property corners.
11. Sidewalks, fences and walls, if installed at the time of initial record drawing submittal, shall be located every 200 feet or alternate lot lines, whichever is closer. Dimensions shall include distance from the right-of-way line and the back of curb and lot line or easement line.
12. Sanitary sewer mainline wyes shall be located from the downstream manhole. These dimensions shall be provided by on-site inspections or televiewing of the sewer following installation.
13. Elevations shall be provided on the top of operating nuts for all water and force main valves.
14. Allowable tolerance shall be ± 6.0 inches for horizontal dimensions. Vertical dimensions such as the difference in elevations between manhole inverts shall have an allowable tolerance of ± 1/8 inch per 50 feet (or part thereof) of horizontal distance up to a maximum tolerance of ± 2 inch.
15. Properly prepared record drawings on mylar, together with two copies, shall be certified by a design professional (Engineer and/or Surveyor registered in the State of Florida), employed by the Contractor, and submitted to the County.

D. Specifications and Addenda; Legibly mark each Section to record:

1. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.
2. Changes made by field order or by change order.

E. Shop Drawings (after final review and approval):

1. Five sets of record drawings for each process equipment, piping, electrical system and instrumentation system.

2.05 SUBMITTAL

A. Prior to substantial completion and prior to starting the bacteria testing of water lines, deliver signed and sealed Record Documents and Record Drawings to the County. These will be reviewed and verified by the inspector. If there are any required changes or additions, these shall be completed and the entire signed and sealed set resubmitted prior to final pay application.

B. The Contractor shall employ a Professional Engineer or Surveyor registered in the State of Florida to verify survey data and properly prepare record drawings. Record drawings shall be certified by the professional(s) (Engineer or Surveyor licensed in Florida), as stipulated by the Land Development Ordinance and submitted on signed and sealed paper drawings, signed and dated mylar drawings together with an AutoCAD version on a recordable compact disk (CD).

C. The CD shall contain media in AutoCad Version 2004 or later, or in any other CAD program compatible with AutoCad in DWG or DXF form. All fonts, line types, shape files, external references, or other pertinent information used in the drawing and not normally included in AutoCad shall be included on the media with a text file or attached noted as to its relevance and use.

D. Accompany submittal with transmittal letter, containing:

1. Date.
2. Project title and number.
3. Contractor's name and address.
4. Title and number of each Record Document.
5. Signature of Contractor or his authorized representative.

Note: The data required to properly prepare these record drawings shall be obtained at the site, at no cost to the County by the responsible design professional or his/her duly appointed representative. The appointed representative shall be a qualified employee of the responsible design professional or a qualified inspector retained by the responsible design professional on a project-by-project basis.

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01730 OPERATING AND MAINTENANCE DATA

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Compile product data and related information appropriate for County's maintenance and operation of products furnished under Contract.

Prepare operating and maintenance data as specified in this and as referenced in other pertinent sections of Specifications.

B. Instruct County's personnel in maintenance of products and equipment and systems.

C. Provide three (3) sets of operating and maintenance manuals for each piece of equipment provided within this Contract.

1.02 FORM OF SUBMITTALS

A. Prepare data in form of an instructional manual for use by County's personnel.

B. Format:

1. Size: 8-1/2 inch x 11 inch
2. Paper: 20 pound minimum, white, for typed pages
3. Text: Manufacturer's printed data or neatly typewritten
4. Drawings:
   a. Provide reinforced punched binder tab, bind in with text.
   b. Fold larger drawings to size of text pages.
5. Provide fly-leaf for each separate product or each piece of operating equipment.
   a. Provide typed description of product and major component parts of equipment.
   b. Provide indexed tabs.
6. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:
   a. Title of Project.
   b. Identity of separate structures as applicable.
   c. Identity of general subject matter covered in the manual.

C. Binders:

1. Commercial quality three-ring binders with durable and cleanable plastic covers.
2. Maximum ring size: 1 inch.
3. When multiple binders are used, correlate the data into related consistent groupings.

1.03 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit three copies of complete manual in final form.

B. Content for each unit of equipment and system, as appropriate:

1. Description of unit and component parts.
   a. Function, normal operating characteristics and limiting conditions.

b. Performance curves, engineering data and tests.
c. Complete nomenclature and commercial number of replaceable parts.

2. Operating Procedures:
   a. Start-up, break-in, routine and normal operating instructions.
   b. Regulation, control, stopping, shut-down and emergency instructions.
   c. Summer and winter operating instructions.
   d. Special operating instructions.
3. Maintenance Procedures:
   a. Routine operations.
   b. Guide to "trouble-shooting".
   c. Disassembly, repair and reassembly.
   d. Alignment, adjusting and checking.
4. Servicing and lubricating schedule.
   a. List of lubricants required.
5. Manufacturer's printed operating and maintenance instructions.
6. Description of sequence of operation by control manufacturer.
7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
   a. List of predicted parts subject to wear.
   b. Items recommended to be stocked as spare parts.
8. As installed control diagrams by controls manufacturer.
9. Each contractor's coordination drawings.
   a. As installed color coded piping diagrams.
10. Charts of valve tag numbers, with location and function of each valve.
11. List of original manufacturer's spare parts, manufacturer's current prices and recommended quantities to be maintained in storage.
12. Other data as required under pertinent sections of specifications.

C. Content, for each electric and electronic system, as appropriate:

1. Description of system and component parts.
   a. Function, normal operating characteristics and limiting conditions.
   b. Performance curves, engineering data and tests.
   c. Complete nomenclature and commercial number of replaceable parts.
2. Circuit directories of panelboards.
   a. Electrical service.
   b. Controls.
   c. Communications.
3. As-installed color coded wiring diagrams.
4. Operating procedures:
   a. Routine and normal operating instructions.
   b. Sequences required.
   c. Special operating instructions.
5. Maintenance procedures:
   a. Routine operations.
   b. Guide to "trouble-shooting".
   c. Disassembly, repair and reassembly.
   d. Adjustment and checking.
6. Manufacturer's printed operating and maintenance instructions.
7. List of original manufacture's spare parts, manufacturer's current prices and recommended quantities to be maintained in storage.
8. Prepare and include additional data when the need for such data becomes apparent during instruction of County's personnel.

D. Prepare and include additional data when the need for such data becomes apparent during instruction on County's personnel.

E. Additional requirements for operating and maintenance data: Respective sections of Specifications.

1.04 SUBMITTAL SCHEDULE

A. Submit one copy of completed data in final form fifteen days prior to substantial completion.

1. Copy will be returned after substantial completion, with comments (if any).

B. Submit two copies of approved data in final form. Final acceptance will not be provided until the completed manual is received and approved.

1.05 INSTRUCTION OF COUNTY'S PERSONNEL

A. Prior to final inspection or acceptance, fully instruct County's designated operating and maintenance personnel in operation, adjustment and maintenance of products, equipment and systems.

B. Operating and maintenance manual shall constitute the basis of instruction.

1. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

DIVISION 2 -

SITE WORK

SECTION 02064 MODIFICATIONS TO EXISTING STRUCTURES, PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals required to modify, alter and/or convert existing structures as shown or specified and as required for the installation of piping, mechanical equipment and appurtenances. Existing piping and equipment shall be removed and dismantled as necessary for the performance of facility alterations in accordance with the requirements herein specified.

PART 2 PRODUCTS

A. Epoxy mortar shall be fiberglass fiber mixed with an epoxy filler.

B. Non-shrink grout shall be a sand-cement, non-metallic formulation, having a 28-day strength of 4,000 psi and 0.0 percent shrinkage per ASTM C1090.

C. Liners to be installed in existing manholes and ~~wetwell~~wet wells shall be spray-applied, monolithic, reinforced urethane resin. Urethane resin-based manhole liner material shall be resistant to hydrogen sulfide gas, and other common contents found in a sanitary sewer environment.

D. Approved manhole and wet well liner products are Raven 405, SprayWall, Green Monster, or SpectraShield.

PART 3 EXECUTION

3.01 GENERAL

A. Cut, repair, reuse, excavate, demolish or otherwise remove parts of the existing structures or appurtenances, as indicated on the construction drawings, or as necessary to complete the work as required. Dispose of surplus materials resulting from the above work in an approved manner. The work shall include all necessary cutting and bending of reinforcing steel, structural steel, or miscellaneous metal work found embedded in the existing structures.

B. Dismantle and remove all existing equipment, piping, and other appurtenances required for the completion of the work. Where called for or required, cut existing pipelines for the purpose of making connections thereto.

C. Anchor bolts for equipment and structural steel to be removed shall be cut off one inch below the concrete surface. Surfaces shall then be refinished using non-shrink grout or epoxy mortar or as indicated on the construction drawings. Repairs to the interior surfaces of existing concrete structures in sanitary sewers shall be made with epoxy mortar. Repairs to be made on other existing concrete surfaces using non-shrink grout shall be made using a bonding agent such as Acrylbond by Concrete Producers Solutions or an equal approved by the County. Remove all dirt, curing compounds, sealers, paint, rust or other foreign material, and etch with muriatic acid solution. Flush with clean water and while still damp, apply a coating of the bonding agent. Place the new grout patch onto the treated area immediately.

D. At the time that a new connection is made to an existing pipeline, additional new piping, extending to and including a new valve, shall be installed. Pipe restraint devices, if required, shall also be installed as required. At the time when a new potable or reclaimed water service is installed, a pipe locator tracer wire shall be installed and connected to the tracer wire at the main.

E. No existing structure, equipment, or appurtenance shall be shifted, cut, removed, or otherwise altered except with the express approval of and only to the extent approved by the County. All existing valve boxes, fire hydrants, air release valve cabinets, and manholes shall be relocated to meet the new finished grade elevations after construction.

F. When removing materials or portions of existing utility pipelines or structures or when making openings in walls and partitions, take all precautions and use all necessary barriers and other protective devices so as not to damage the structures beyond the limits necessary for the new work, and not to damage the structures or contents by falling or flying debris. Unless otherwise approved by the County, saw-cutting, rotary core-boring, or line drilling will be required in removing material from existing concrete structures or pipes.

G. Materials and equipment removed in the course of making alterations and additions shall remain the property of the County, except that items not salvageable, as determined by the County, shall be disposed of off the work site.

H. All alterations to existing utility pipes and structures shall be done at such time and in such a manner as to comply with the approved time schedule. Before any part of the work is started, all tools, equipment, and materials shall be assembled and made ready so that the work can be completed without delays.

I. All cutting of existing concrete or other material to provide suitable bonding to new work shall be done in a manner to meet the requirements of the respective section of these Standards covering the new work. When not covered, the work shall be carried on in the manner and to the extent directed by the County or per the construction drawings.

J. Surfaces of seals visible in the completed work shall be made to match as nearly as possible the adjacent surfaces.

K. Non-shrink cementatious grout shall be used for setting wall castings, sleeves, leveling pump bases, doweling anchors into existing concrete and elsewhere as shown on the construction drawings. The surface to which grout is to be applied shall be wetted to facilitate good bonding.

L. Where necessary or required for the purpose of making connections; cut existing pipelines in a manner to provide an approved joint. Where required, use flanges, couplings, or adapters, all as required.

M. Provide flumes, hoses, piping, pumps and well points, and other related items to divert or provide suitable plugs, bulkheads, or other means to hold back the flow of water or other liquids, all as required in the performance of the work.

N. Care shall be taken not to damage any part of existing buildings or foundations or outside structures.

O. Prior to entering confined spaces in sanitary sewer structures, conduct an evaluation of the atmosphere within, in accordance with local, state, and federal regulations. Provide ventilation equipment and other equipment as required to assure safe working conditions.

3.02 CONNECTING TO EXISTING PIPING AND EQUIPMENT

The Contractor shall verify exact location, material, alignment, joint, etc. of existing piping and equipment prior to making the connections called out in the Drawings. The verifications shall be performed with adequate time to correct any potential alignment or other problems prior to the actual time of connection. A County Inspector must be present for all tie-ins for a visual inspection.

3.03 REMOVAL AND ABANDONMENT OF ASBESTOS CEMENT PIPE AND APPURTENANCES

A. All work associated with the removal or abandonment of existing asbestos cement pipe and appurtenances shall be performed by a licensed asbestos removal Contractor registered in the State of Florida.

B. The asbestos Contractor shall contact the appropriate regulatory agencies prior to removal or abandonment of any asbestos material and shall obtain all required permits and licenses and issue all required notices. The cost for all fees associated with permits, licenses and notices to the governing regulatory agencies shall be borne by the asbestos Contractor.

C. All work associated with removal or abandonment of asbestos cement pipe and appurtenances shall be performed in accordance with the standards listed below and all other applicable local, State, or Federal standards.

(1) Florida Administrative Code, Chapter 62-257, ASBESTOS PROGRAM
(2) Title 40 CFR, Part 61, Subpart M, NATIONAL EMISSION STANDARD FOR ASBESTOS
(3) Occupational Safety and Health Act, Title 29 CFR
(4) Title 40 CFR, Part 763, ASBESTOS
(5) Florida Statute Title XXXII, Chapter 469, ASBESTOS ABATEMENT

D. All asbestos cement pipe sections indicated on the construction drawings to be removed, and all related tees, valves, fittings and appurtenances shall be removed in their entirety and disposed of by the asbestos Contractor in accordance with this Section. Asbestos cement nipples between tees and valves shall be replaced. After removal of the pipelines, all excavations shall be backfilled in accordance with the applicable provisions of the Trenching and Excavation Section of these Standards. The cost of disposing of the removed materials shall be borne by the asbestos Contractor.

E. The cutting of existing asbestos-cement (A/C, a.k.a. "Transite") pipe shall be by hand tools only. No powered machine cutting is allowed. Removal of all fragments of pipe shall be double bagged prior to shipment. Longer sections of pipe removed may be shipped without double bagging. An asbestos manifest form must accompany each shipment of such pipe or pipe material waste to the Manatee County Lena Road Landfill. Prior to each shipment, a minimum of 24 hours notice to the Landfill field office (telephone (941) 748-5543) is required.

3.04 IN-PLACE GROUTING OF EXISTING PIPE

A. Where water and wastewater utility pipes are to be abandoned in place, they shall be filled with a nonshrinking sand-cement grout. When such pipes are made of asbestos-cement materials, the abandonment activities shall be performed by a licensed asbestos Contractor. It is completely the Contractor's responsibility to obtain all regulatory clearances and provide documentation in cases where they have determined that an asbestos-cement pipe abandonment activity by in-place grouting does not require a licensed asbestos Contractor.

B. The ends of the pipe sections to be grout-filled shall be capped or plugged with suitable pipe fittings. The grout material shall be of suitable properties and the pumping pressure shall be such that the pipe sections are filled completely with grout. All above ground features shall be removed: hydrants, meters, valve & meter boxes, pads, vaults, etc. Existing tees, crosses, and valves left in service shall be plugged and restrained.

C. The County shall be given timely notice so that the County's representative may be present to monitor all pipe grouting operations. Provide standpipes and/or additional means of visual inspection as required to determine if adequate grout material has filled the entire pipe sections.

D. All tees, crosses, and valves left in service shall be plugged and restrained.

3.05 SPRAY-APPLIED LINERS

A. Use a high-pressure water spray to remove all foreign material from the walls and bench of the structure. Loose or protruding masonry materials shall be removed using a hammer and chisel. Fill any voids, holes or cracks using a hand trowel with epoxy mortar to form a uniform surface. Place covers over all pipe openings to prevent extraneous material from entering the pipes. Block or divert sewer flow from entering the structure. Any infiltration leaks shall be stopped by using such methods as approved by the County.

B. The liner material shall be sprayed onto the invert, bench and wall areas. The sprayed-on material shall be applied such that the entire structure is lined with a structurally enhanced monolithic liner. The thickness of the wall liner material shall be such that it will withstand the hydraulic load generated by the surrounding groundwater table, using a factor of safety of two, and using the assumption that the groundwater table is at the level of the top of the structure. The invert and bench liner material shall be the same thickness as that required for the base of the wall.

C. Special care shall be used to provide a smooth transition between the intersecting pipelines and the manhole inverts such that flow is not impaired. Remove concrete material from the existing manhole base channel in depth to the required thickness of the new liner material.

D. No active sewer flow shall be allowed in the newly lined structure, nor shall any vacuum tests be performed, until the liner material has had adequate time to cure, as recommended by the liner material manufacturer.

E. Install the coating systems per manufacturer's recommendation and completely protect the structure from corrosion. The liner or coating systems must extend and seal onto manhole ring, onto and around pipe openings and any other protrusions, and completely cover the bench and flow invert. Provide a five (5)-year unlimited warranty on all workmanship and products. The work includes the surface preparation and application of the coating or liner

system, and shall protect the structure for at least five (5) years from all leaks and from failure due to corrosion from exposure to corrosive gases such as hydrogen sulfide.

3.06 CONNECTION TO EXISTING MANHOLE

A. Where required or as indicated on the construction drawings, make connection of new pipelines to existing manhole structures. If pipe stub-outs of the correct size and position are not available, make connections by removing a portion of the manhole wall by mechanical rotary core boring. The connection between pipe and concrete manhole shall be complete with resilient seals meeting the requirements of ASTM C923.

B. A new channel shall be formed in the manhole base by removing and reforming or by providing new concrete to convey the new flow into the existing channel in accordance with the standard requirements for new sewer manhole structures. Flow direction shall not change by more than 90 degrees within the manhole base.

C. Repair internal coating of existing manholes cored during connection of new sewers by applying approved coating material as listed above in accordance with the manufacturer's recommendations. If existing manhole has an internal coating other than that listed above, sandblast the interior of the existing manhole and apply an approved coating in accordance with the manufacturer's recommendations.

D. When connecting a force main to an existing manhole, the force main termination manhole and the next two manholes downstream shall be rehabilitated and lined with a currently approved liner. If the existing manholes are lined with a non-conforming liner according to Part 2.D above, the existing liner shall be removed and replaced, unless otherwise noted on the plans or with written approval by the County.

END OF SECTION

SECTION 02220 EXCAVATION, BACKFILL, FILL AND GRADING FOR STRUCTURES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Structural excavation shall consist of the removal of material for the construction of foundations for structures and other excavation designated on the drawings or in these specifications.

B. Structural excavation and backfill shall consist of furnishing material, if necessary and placing and compacting backfill material around structures to the lines and grades designated on the drawings, as specified or directed by the County.

C. Structural excavation and backfill shall include the furnishing of all materials, equipment and other facilities which may be necessary to perform the excavations, place and compact the backfill, install sheeting and bracing, and carry out any necessary dewatering. It shall also include the wasting or disposal of surplus excavated material in a manner and in locations approved by the County.

D. The Contractor is responsible for the protection of every tree which is scheduled to remain in the project area. This includes trees which may or may not be shown on the plans. Every tree shall be adequately protected in place at no additional cost to the County. This includes, but is not limited to, protecting the root systems and adjusting grades as necessary for tree/root protection.

1.02 QUALITY ASSURANCE

A. Testing Agency:

1. In place soil compaction tests shall be performed by a qualified testing laboratory.
2. Compaction tests shall be taken every 500 feet, except in the road crossings or road shoulders. Tests are to be taken according to current FDOT Standards.

B. Reference Standards:

1. American Society for Testing and Materials (ASTM):
   a. ASTM D1557, Moisture-Density Relations of Soils Using 10-lb. (4.5-kg) Rammer and 18-in. (457-mm) Drop.

1.03 JOB CONDITIONS

A. The Contractor shall provide, operate and maintain all necessary pumps, discharge lines, well points, etc., in sufficient number and capacity to keep all excavation, bases, pits, etc., free from seepage, standing or running water at all times throughout the period of construction.

B. The Contractor shall assume all responsibility for the security of the excavation required, employing bracing, lining or other accepted means necessary to accomplish same.

C. Excavated areas shall be cleared of all debris, water, slush, muck, clay and soft or loose earth and shall be conditioned to the entire satisfaction of the County.

D. All excavated material unsuitable for use or which will not be used shall be disposed of in a manner consistent with State and County regulation.

E. All unsuitable organic materials, roots, logs, etc., found during excavation shall be removed by the Contractor and the trench shall be refilled with suitable material.

PART 2 PRODUCTS

2.01 MATERIAL FOR CONTROLLED FILL

A. Composition: Only approved material free from organic matter and lumps of clay, shall be used for backfill. Excavated earth free from debris or organic material may be used for backfilling foundations or fill.

B. Crushed stone and shell shall meet or exceed current FDOT Standards.

2.02 UNSUITABLE MATERIAL

Unsuitable material shall be defined as highly organic soil per ASTM D2487 Group PT. This includes, but is not limited to, such items as topsoil, roots, vegetable matter, trash, debris, and clays that cannot be dried sufficiently to obtain specified compaction.

PART 3 EXECUTION

3.01 INSPECTION

A. The Contractor shall verify that work preceding the affected work of this Section has been satisfactorily completed.

B. Conditions adversely affecting the work of this Section shall be corrected to the satisfaction of the County.

3.02 REMOVAL OF UNSUITABLE MATERIALS

A. The Contractor shall remove unsuitable material from within the limits of the Work.

B. Materials meeting requirements for controlled fill shall be stockpiled as necessary and in such a manner satisfactory to the County.

C. All material excavated shall be placed so as to minimize interference with public travel and to permit proper access for inspection of the work.

3.03 EXCAVATION

A. When concrete or shell subbase footing is to rest on an excavated surface, care shall be taken not to disturb the natural soil. Final removal and replacement of the foundation material and subbase compaction to grade shall not be made until just before the concrete or masonry is placed.

B. When any structural excavation is completed, the Contractor shall notify the County who will make an inspection of the excavation. No concrete or masonry shall be placed until the excavation has been approved by the County.

C. The elevations of the footing bottom and the base slab as shown on the Drawings, shall be considered as approximate and the County may order in writing, such changes in dimensions or elevations of the footings and slab base as necessary to secure satisfactory foundations.

D. All excavation shall be made within an area bounded by lines five feet outside and parallel to the exterior walls of the structure to allow for correct forming, shoring and inspection of foundation work. Pouring of concrete against earth side walls shall not be permitted.

E. If the ground is excavated below the grade called for by the Drawings or becomes unstable due to the Contractor's carelessness or operations, the ground shall be excavated to undisturbed native soil before continuing concreting operations.

F. If in the opinion of the County, the material at or below the normal grade of the bottom of the trench is unsuitable for pipe or structure foundation, it shall be removed to the depth directed by the County and if so directed, replaced by crushed stone or washed shell.

3.04 STRUCTURAL BACKFILL

A. Structural backfill shall not be placed until the footings or other portions of the structure or facility have been inspected by the County and approved for backfilling.

B. A minimum of 1-1/2" layer of lean concrete shall be placed as a working mat for the concrete base slabs and footings if required by the County.

C. Fill shall be placed in uniform layers not more than 12" thick and compacted to a minimum of 98 percent of the maximum density determined by ASTM D1557, Method A or C, or as directed by the County. The Contractor shall securely tamp the backfill with pneumatic rammer around all wall foundations. The method of compaction shall be satisfactory to the County.

D. Compaction of structural backfill by ponding and jetting may be permitted when, as determined by the County: the backfill material is of such character that it will be self-draining when compacted; foundation materials will not soften or be otherwise damaged by the applied water; no damage from hydrostatic pressure will result to the structure. Ponding and jetting within two feet below finished subgrade shall not be permitted in roadway areas. At the discretion of the County, ponding and jetting may be permitted with compaction layers not to exceed four feet.

E. Surplus material not used on-site shall be removed and disposed of off-site by the Contractor. In no case shall surplus material be deposited on adjacent lands. Fill used for grading shall be placed in layers not to exceed 12 inches in thickness and shall be compacted to a density equal or greater to that of the surrounding natural ground.

3.05 BACKFILLING AROUND STRUCTURES

A. Common fill and structural fill are specified for use as backfill against the exterior walls of the structures. Fill shall be placed in layers having a maximum thickness of eight (8) inches in loose state and shall be compacted sufficiently to prevent settlement. If compaction is by rolling or ramming, material shall be wetted down as required. Where material can be suitably compacted by jetting or puddling, the Contractor may use one of these methods. No boulders shall be allowed to roll down the slopes and hit the walls.

B. Backfilling shall be carried up evenly on all walls of an individual structure simultaneously. A variation of two (2) feet in elevation will be the maximum allowable. No backfill shall be allowed against walls until the walls and their supporting slabs, if applicable, have attained sufficient strength. Backfilling shall be subjected to approval by the County.

C. In locations where pipes pass through building walls, the Contractor shall take the following precautions to consolidate the refill up to an elevation of at least one foot above the bottom of the pipes:

1. Place structural fill in such areas for a distance of not less than three feet either side of the center line of the pipe in level layers not exceeding 6-inches in depth.
2. Wet each layer to the extent directed and thoroughly compact each layer with a power tamper to the satisfaction of the County.
3. Structural fill shall be of the quality specified under Part 2 of this Section.

D. The surface of filled areas shall be graded to smooth true lines, strictly conforming to grades indicated on the grading plan. No soft spots or uncompacted areas shall be allowed in the work.

E. Temporary bracing shall be provided as required during construction of all structures to protect partially completed structures against all construction loads, hydraulic pressure and earth pressure. The bracing shall be capable of resisting all loads applied to the walls as a result of backfilling.

3.06 FIELD QUALITY CONTROL

A. The density of soil in place shall be a minimum of 95 percent in accordance with ASTM test 1557-70T, Method A or C.

END OF SECTION

SECTION 02221 TRENCHING, BEDDING AND BACKFILL FOR PIPE

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials, equipment and incidentals necessary to perform all dewatering, excavation, backfill, fill, grading, trench protection or other related work required to complete the piping work shown on the Drawings and specified herein. The work shall include, but not be limited to: vaults; duct conduit; pipe; roadways and paving; backfilling; required fill or borrow operations; grading; disposal of surplus and unsuitable materials; and all related work such as sheeting, bracing and dewatering.

B. Prior to commencing work, the Contractor shall examine the site and review test borings if available, or undertake his own subsurface investigations and take into consideration all conditions that may affect his work.

C. The Contractor is responsible for the protection of every tree which is scheduled to remain in the project area. This includes trees which may or may not be shown on the plans. Every tree shall be adequately protected in place at no additional cost to the County. This includes, but is not limited to protecting the root systems and adjusting grades as necessary for tree/root protection.

1.02 PROTECTION

A. Sheeting and Bracing in Excavations:

1. In connection with construction of underground structures, the Contractor shall properly construct and maintain cofferdams. These shall consist of: sheeting and bracing as required to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction and to protect adjacent structures, existing yard pipe and/or foundation material from disturbance, undermining, or other damage. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and rammed.

2. Trench sheeting for pipes: no sheeting is to be withdrawn if driven below, mid-diameter of any pipe and no wood sheeting shall be cut off at a level lower than one foot above the top of any pipe unless otherwise directed by the County. During the progress of the work, the County may direct the Contractor in writing to leave additional wood sheeting in place. If steel sheeting is used for trench sheeting, removal shall be as specified above, unless written approval is given for an alternate method of removal.

3. All sheeting and bracing not left in place shall be carefully removed in such a manner as not to endanger the construction or other structures, utilities, existing piping, or property. Unless otherwise approved or indicated on the Drawings or in the Specification, all sheeting and bracing shall be removed after completion of the piping or structure, care being taken not to disturb or otherwise injure the pipeline or finished masonry. All voids left or caused by withdrawal of sheeting shall be immediately refilled with sand by ramming with tools specifically made for that purpose, by watering, or as may otherwise be directed.

4. The Contractor shall construct, to the extent he deems it desirable for his method of operation, the cofferdams and sheeting outside the neat lines of the pipeline trench or foundation unless otherwise indicated on the Drawings or directed by the County. Sheeting shall be plumb and securely braced and tied in position. Sheeting, bracing and cofferdams shall be adequate to withstand all pressures to which the pipeline or structure will be subjected. Pumping, bracing and other work within the cofferdam shall be done in a manner to avoid disturbing any construction of the pipeline or the enclosed masonry. Any movement or bulging which may occur shall be corrected by the Contractor at his own expense so as to provide the necessary clearances and dimensions.

5. Drawings of the cofferdams and design computations shall be submitted to the County and approved prior to any construction. However, approval of these drawings shall not relieve the Contractor of the responsibility for the cofferdams. The drawings and computations shall be prepared and stamped by a Registered Professional Engineer in the State of Florida and shall be in sufficient detail to disclose the method of operation for each of the various stages of construction, if required, for the completion of the pipeline and substructures.

B. Dewatering, Drainage and Flotation

1. The Contractor shall construct and place all pipelines, concrete work, structural fill, bedding rock and limerock base course, in-the-dry. In addition, the Contractor shall make the final 24" of excavation for this work in-the-dry and not until the water level is a minimum of 18 below proposed bottom of excavation.

2. The Contractor shall, at all times during construction, provide and maintain proper equipment and facilities to remove promptly and dispose of properly all water entering excavation and keep such excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition until the fill, structure, or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural elevations. At all times during the construction operations, the groundwater levels shall be maintained at an elevation 18 inches below the lowest level where structures are being installed.

3. Dewatering shall at all times be conducted in such a manner as to preserve the natural undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.

4. Wellpoints may be required for dewatering the soil prior to final excavation for deeper in-ground structures or piping and for maintaining the lowered groundwater level until construction has been completed to avoid the structure, pipeline, or fill from becoming floated or otherwise damaged. Wellpoints shall be surrounded by suitable filter sand and no fines shall be removed by pumping. Pumping from wellpoints shall be continuous and standby pumps shall be provided.

5. The Contractor shall furnish all materials and equipment to perform all work required to install and maintain the proposed drainage systems for handling groundwater and surface water encountered during construction of structures, pipelines and compacted fills.

6. Where required, the Contractor shall provide a minimum of two operating groundwater observation wells at each structure to determine the water level during

construction of the pipeline or structure. Locations of the observation wells shall be at structures and along pipelines as approved by the County prior to their installation. The observation wells shall be extended to 6 inches above finished grade, capped with screw-on caps protected by 24" x 24" wide concrete base and left in place at the completion of this Project.

7. Prior to excavation, the Contractor shall submit his proposed method of dewatering and maintaining dry conditions to the County for approval. Such approval shall not relieve the Contractor of the responsibility for the satisfactory performance of the system. The Contractor shall be responsible for correcting any disturbance of natural bearing soils for damage to pipeline or structures caused by an inadequate dewatering system or by interruption of the continuous operation of the system as specified.

8. As part of his request for approval of a dewatering system, the Contractor shall demonstrate the adequacy of the proposed system and wellpoint filter sand by means of a test installation. Discharge water shall be clear, with no visible soil particles in a one quart sample. Discharge water shall not flow directly into wetlands or Waters of the State as defined by FDEP and SWFWMD.

9. During backfilling and construction, water levels shall be measured in observation wells located as directed by the County.

10. Continuous pumping will be required as long as water levels are required to be below natural levels.

PART 2 PRODUCTS

2.01 MATERIALS

A. General

1. Materials for use as fill and backfill shall be described below and shall be from an FDOT certified pit. For each material, the Contractor shall notify the County of the source of the material and shall furnish the County, for approval, a representative sample weighing approximately 50 pounds, at least ten calendar days prior to the date of anticipated use of such material.

2. Additional materials shall be furnished as required from off-site sources and hauled to the site.

B. Bedding - shall conform to FDOT Standard Specifications for Road and Bridge Construction, Section 901 Coarse Aggregate, and shall be either coarse aggregate of Size No. 57 or coarse sand of Size No. 9. Washed shell size No.57 may be used as an alternate bedding material.

C. Structural Fill

1. Structural fill in trenches shall be used below spread footing foundations, slab-on-grade floors and other structures as backfill within three feet of the below grade portions of structures.

2. Shall be either soil classification A-1, A-2 or A-3, per AASHTO M-145, and shall be free of organic matter, lumps of clay or marl, muck, compressible materials, and rock exceeding 2.5 inches in diameter. Broken concrete, masonry, rubble or other similar materials shall not be used as backfill. Minimum acceptable density shall be 98 percent of the maximum density as determined by AASHTO T-180.

D. Selected Common Fill - shall have the same material classification and requirements as Structural Fill, as described above.

E. Common Fill

1. Shall be either soil classification A-1, A-2, A-3, A-4, A-5 or A-6, per AASHTO M-145, and shall be free of organic matter, lumps of clay or marl, muck, compressible materials and rock exceeding 2.5 inches in diameter. Broken concrete, masonry, rubble or other similar materials shall not be used as backfill.

2. Material falling within the above specification, encountered during the excavation, may be stored in segregated stockpiles for reuse. All material which, in the opinion of the County, is not suitable for reuse shall be spoiled as specified herein for disposal of unsuitable materials by the Contractor.

E. Unsuitable Material - soil classification A-7 and A-8, per AASHTO M-145, shall not be used as backfill material.

PART 3 EXECUTION

3.01 EXCAVATION

A. Excavate trenches and pits for structures to the elevations indicated on the construction drawings. Take special care to avoid over-excavating or disturbing the bottom of the trench or pit, so that the soil at the bottom of the hole remains in a naturally compacted condition. Excavate to widths sufficient to provide adequate working room to install the required structures. Do not excavate the final layer of soil to the designed grade until just before placing the bedding, foundation, pipe, structure, or masonry work required. Remove boulders, rocks, logs or any unforeseen obstacles encountered.

B. In case the foundation soil found at the bottom of the trench or pit is soft, plastic or mucky, or does not conform to the soils classification specified as suitable foundation material, over-excavation to a greater depth will be required. Soils not meeting the classification required for foundation material shall be removed to a depth at least four inches below the bottom of the pipe, bedding or structure bottom elevation. Rock, boulders or other hard or lumpy material shall be removed to a depth 12 inches below the bottom of the pipe, bedding or structure bottom elevation. Remove muck, clay or other soft material to a depth as needed to establish a firm foundation.

C. Where possible, the sides of trenches should be vertical up to at least the spring line of the installed pipe.

D. Trench excavation shall be performed in accordance with Florida Statute Title XXXIII, Chapter 553, Part III, Trench Safety Act.

3.02 BACKFILLING

A. Backfill materials shall be placed on solid, firm, naturally compacted or compacted to 98 percent of the maximum dry density of the material as determined by AASHTO T-180, dry or dewatered in place soil foundations.

B. Where over-excavation is required due to nonconforming soil classification or rocky, unstable, or otherwise undesirable soil conditions, place Structural Fill or Selected Common Fill in the over-excavated zone up to the base of the bedding material layer. Compact the over-excavated zone to 98 percent of the maximum dry density of the material as determined by AASHTO T-180.

C. When backfilling in an over-excavated zone where moist or watery conditions exist, backfill shall be coarse No. 9 sand or a mixture of No. 57 coarse aggregate with either No. 9 coarse sand, A-1, or A-3 material.

D. After compaction, backfill material in the over-excavation zone shall form a solid and firm foundation on which to build up successive layers of backfill and structures.

E. Bedding materials shall be placed on solid, firm soil foundations and shall be compacted to 98 percent of the maximum dry density of the material as determined by AASHTO T-180.

F. Concrete and masonry structures shall be backfilled using Structural Fill. Backfilling and compaction shall be underneath the structure and carried up evenly on all walls of an individual structure simultaneously. The maximum allowable difference in backfill elevations shall be two feet. No backfilling shall be allowed against concrete or masonry walls until the walls and their supporting slabs have been in place at least seven days or until the specified 28-day strength has been attained. Compaction of Structural Fill underneath the base and along the walls shall be 98 percent of the maximum dry density of the material as determined by AASHTO T-180. The Structural Fill shall be either dried or shall have water added so that the moisture content of the material is within a range that will allow the required density to be achieved.

G. Trenching backfill for pipe installation shall be Selected Common Fill for the pipe bedding zone. The pipe bedding envelope shall begin at the level four inches, six inches, or nine inches, depending on pipe diameter, below the bottom of the pipe, and shall extend vertically up to a level 12 inches above the top of the pipe. Where the in-place soil material within the four inch, six inch, or nine inch pipe bedding zone beneath the bottom of the pipe meets the soil classification for Selected Common Fill, undercutting of the trench below the bottom of the pipe will not be required. In this case, loosen the soil in the bottom of the trench immediately below the middle third of the pipe diameter, and place the pipe upon it. Where the in-place soil material within the pipe bedding zone does not meet the soil classification for Selected Common Fill, undercutting shall be required, and the bedding zone shall be backfilled with Selected Common Fill. In this case, place the pipe bedding material and leave it in a moderately firm uncompacted condition under the middle third of the pipe diameter, and compact the outer portions of the trench bottom to 98 percent of the maximum dry density. Soils that were over-excavated due to rocky, soft or otherwise unsuitable soil foundation conditions shall also be replaced with Selected Common Fill. Compaction of Selected Common Fill shall be 98 percent of the maximum dry density as determined by AASHTO T-180. Such backfill material shall have an optimized moisture content that will allow the required density to be achieved.

H. Pipe sections for gravity flow systems shall be laid with spigots downstream and bells upstream. Excavate for pipe bells before laying pipe. Lay pipe true to the lines and grades indicated on the construction plans. Place backfill material on both sides of the pipe and compact to 98 percent of the maximum dry density of the material as determined by AASHTO T-180. Take special care to effectively fill and compact the material in the haunch areas under the sides of the pipe.

I. For pipes that are not installed under roadways or driveways, trenching backfill for pipe installation shall be Common Fill above the pipe envelope zone, and shall be compacted to 95 percent of the maximum dry density of the material as determined by AASHTO T-180, and shall have moisture content optimized to allow the required density. For pipes that are installed under roadways or driveways, trenching backfill for pipe installation shall be Selected Common Fill above the pipe envelope zone, and shall be compacted to 98 percent of the maximum dry density of the material as determined by AASHTO T-180, and shall have moisture content optimized to allow the required density. Selected Common Backfill shall be placed in layers not to exceed 6 inches. Common Backfill shall be placed in layers not to exceed 12 inches.

J. Backfill compaction tests shall be performed every 500 feet in pipe line trenches and for every utility structure. Test reports shall be presented to the County Inspector.

3.03 GRADING AND CLEAN UP

A. Surplus and unsuitable soil materials not used on-site shall be removed and disposed of off-site in a manner that is consistent with state and local regulations. In no case shall surplus or unsuitable material be deposited on-site or on adjacent lands.

B. The surface of backfilled areas shall be graded smooth and true to the lines and grades indicated on the construction plans. No soft spots or uncompacted areas shall be allowed in the work.

C. Upon completion of the work, leave the work areas and all adjacent areas in a neat and presentable condition, clear of all temporary structures, rubbish and surplus materials. Pile any salvageable materials that have been removed in neat piles for pickup by County crews, unless otherwise directed.

END OF SECTION

SECTION 02480 LANDSCAPING

PART 1 GENERAL

1.10 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials, equipment, and incidentals required to install trees, ground cover, and shrubs, to place accessory planting materials, to maintain and guarantee all planted areas. All work shall be in strict accordance with sound nursery practice and shall include maintenance and watering of all of the work of this Contract until final completion and acceptance by the County.

B. The landscaping shall be performed by a contractor or subcontractor who specializes in landscaping and who is fully familiar and experienced in projects of this type and scope. The landscaping contractor or subcontractor shall be subject to the approval of the County.

C. The Contractor shall provide all landscaping complete and ready for use as specified in the Contract Documents and as shown on the Drawings.

1.02 SUBMITTALS

A. The Contractor shall submit to the County for review and approval, shop drawings and complete written maintenance instructions for each type of plant furnished under this Contract.

B. The Contractor shall submit representative samples of any or all of required accessory planting materials as requested by the County.

1.03 OBSTRUCTIONS BELOW GROUND

A. The County may change the location of plant material if underground construction, utilities or obstructions are encountered in excavation of planting areas or pits.

B. The Contractor shall make such changes without additional compensation from the County.

PART 2 PRODUCTS

2.01 MATERIALS

A. Plant species and size shall conform to those indicated in the Plant List and in plan locations shown on the Drawings. Nomenclature shall conform to the Florida Department of Agriculture: "Grades and Standards for Nursery Plants". The designated authority for identification of plants shall be in conformance with FDOT Standard Specification Section 580-2.1.1 Plants.

B. Plants shall be sound, healthy, vigorous, free from plant diseases, insects, pests, or their eggs and shall have healthy normal root systems. Plants shall be nursery grown stock, freshly dug. No heeled in, cold storage, or collected stock shall be accepted.

C. Shape and Form

1. Plant material shall be symmetrical, typical for the variety and species, and shall conform to the measurements specified in the Plant List.

2. Plants used where symmetry is required shall be matched as nearly as possible.
3. Plants shall not be pruned prior to delivery except as authorized by the County.
4. All plants shall have been transplanted or root pruned at least once in the past three years.
5. Unless otherwise noted, street trees shall be free of branches up to six feet, with the single leader well branched, and with straight trunks.
6. Shrubs shall have been transplanted twice, have fully developed root systems, be heavily canned with foliage to base, fulfill dimensions required, and be typical of species.
7. Ground covers shall have sturdy fibrous root systems and shall be heavily leafed.

D. Measurement: The height and/or width of trees shall be measured from the ground or across the normal spread of branches with the plants in their normal position. This measurement shall not include the immediate terminal growth.

E. Substitutions in plant species or size shall be made only with the written approval of the County.

F Ground cover plants shall be planted in beds of four inches of approved topsoil. The beds shall be thoroughly disked into the soil. The compacted and settled finished surface shall be set to the required grade. Plants shall be spaced as described in the Contract Documents or shown on the Contract Drawings, or otherwise directed by the County in accordance with the best practices of the trade.

G. Planting Soil

1. Soil for backfilling around plants and planting beds shall be a good grade of garden loam as approved by the County. Soil shall be free of heavy clay, coarse sand, stones, lumps, sticks, or other foreign material. The soil shall not be delivered or used in a muddy condition.
2. The soil shall be taken from ground that has never been stripped. There shall be a slight acid reaction to the soil with no excess of calcium or carbonate. The soil shall be free from excess weeds or other objectionable material.
3. Soil for trees and shrubs shall be delivered in a loose, friable condition. All trees shall average approximately one cubic yard per tree, except Sabal Palmetto, which shall be planted with clean sand. There shall be a minimum of 4-inches of planting soil in ground cover areas and 1/8 cubic yard per shrub or vine.
4. No marl shall be allowed in ground cover planting beds.

H. Before plants are backfilled with planting soil, fertilizer tablets, Agriform 20-10-5 or equal, shall be placed in each pit. The Contractor shall provide three tablets for each tree and one for each shrub or vine.

I. Tree Staking: All tree staking and bracing shall be included herein in accordance with sound nursery practice and shall be in accordance with the Contract Documents. The Contractor shall furnish all materials required for staking and bracing as approved.

J. Landscaping stones shall be inert and nonleaching. The Contractor shall provide physical samples for approval prior to installation. Crushed limerock shall not be acceptable.

PART 3 EXECUTION

3.01 PLANTING PROCEDURES

A. Plant Locations: All plants shall be located as shown on the Drawings, to dimensions if shown, to scale if not dimensioned. Large areas or beds shall be scaled and the plants spaced evenly. Approval by the County is required before any plants may be installed.

B. Tree Pits: Pits for trees shall be at least two feet greater in diameter than the specified diameter of the ball. Pits shall be of sufficient depth to allow a 12-inch layer of planting soil under the ball when it is set to grade. Bottom of pit shall be loosened prior to backfilling.

C. Digging and Handling

1. Plants shall be handled at all times so that roots or balls are adequately protected from sun or drying winds. Tops or roots of plant allowed to dry out will be rejected.
2. Balled and burlapped plants shall be moved with firm, natural balls of soil, not less than one foot diameter of ball to every one inch caliper of trunk, and a depth of not less than 2/3 of ball diameter. No plant shall be accepted when the ball of earth surrounding its roots has been cracked or broken. All trees, except palms, shall be dug with ball and burlapped. Root pruning shall have been done at minimum of four weeks before planting at the job.
3. Bare root plants shall be dug with spread of root and of sufficient depth to insure full recovery of plant.

D. Cabbage Palms (Sable Palmetto):

1. Cabbage Palms shall be taken from moist black sand areas. Only a minimum of fronds shall be removed from the crown to facilitate moving and handling. Clear trunk or overall height shall be as specified after the minimum of fronds have been removed.
2. Cabbage Palms buds shall be tied to a suitable support with a burlap strip, to be left in place until the tree is well established in its new location.
3. Cabbage Palms shall be planted in sand, thoroughly washed in during planting operations, and with a dished or saucer depression left at the soil line for future waterings. Palms with marred or burned trunks will be accepted at the discretion of the County only.
4. Trees moved by winch or crane shall be thoroughly protected from chain marks, girdling or bark slippage by means of burlap, wood battens, or other approved method.

E. When balled or burlapped plants are set, planting soil shall be carefully tamped under and around the base of the balls to prevent voids. All burlap, rope, wires, etc., shall be removed from the sides and tops of balls, but no burlap shall be pulled from underneath. Roots of bare rooted plants shall be properly spread out and planting soil carefully worked in among them.

F. All plants shall be set straight or plumb, in locations shown on the Drawings. Except as otherwise specified, plants shall be planted in pits which shall be set at such level that, after settlement, they bear the same relation to the finished grade or the surrounding ground as they bore to the grade of the soil from which they are taken.

G. Pruning shall be carefully done by experienced plantsmen. Prune immediately upon acceptance by the County, including any broken branches, thinning small branches and tipping back main branches (except main leaders).

H. Excess soil and debris shall be disposed of off the project site unless ordered stockpiled by the County.

3.02 NORMAL MAINTENANCE OF PLANT MATERIALS

A. Plant material maintenance shall begin when planting operations start and shall extend until final acceptance of work.

B. Maintain all plant materials under this Contract to the satisfaction of the County. Maintenance shall include necessary watering, cultivation, weeding, pruning, spraying, tightening and repair to guy wires, removal of dead material, resetting, and other work required to conform with referenced standards and accepted nursery standards as approved.

C. Plant materials which are in a tilted or in a leaning position shall be properly righted.

D. After final acceptance by the County and until one calendar year after acceptance of all plantings, the landscaping contractor or subcontractor shall make monthly inspections of materials and report in writing to the County the conditions of the plants and the necessary requirements to keep the plants in a healthy growing condition.

3.03 TREE AND PLANT PROTECTION

A. The Contractor shall remove all trees (if any) within the limit of landscaping shown on the detail sheet except those designated to be salvaged (if any). Prior to removal of said trees, the Contractor shall obtain a tree removal permit, if required. All other trees in the vicinity of the work shall be protected against damage by the Contractor until all work under the Contract has been completed.

B. Consult with the County, and remove agreed-on roots and branches which interfere with construction. Employ qualified tree surgeon to remove, and to treat cuts.

C. Provide temporary barriers to a height of six feet around each group of trees and plants.

D. Protect root zones of trees and plants

1. Do not allow vehicular traffic or parking.
2. Do not store materials or products.
3. Prevent dumping or refuse or chemically injurious materials or liquids.
4. Prevent puddling or continuous running water.

E. Carefully supervise excavating, grading, and filling, and subsequent construction operations, to prevent damage.

F. In case of inadvertent damage to any tree or plant by the Contractor or any of his subcontractors or employees, the Contractor shall provide replacement of each such damaged tree or plant with a new one of acceptable type, size and quality.

G. Completely remove barricades, including foundations, when construction has progressed to the point that they are no longer needed, and when approved by the County.

H. Clean and repair damage caused by installation, fill and grade the areas of the site to

required elevations and slopes, and clean the area.

3.04 GUARANTEE

The life and satisfactory condition of all plant material planted shall be guaranteed by the Contractor for a minimum of one calendar year. Guarantee shall include complete replacement with material of the same kind and size as in the original work if not in a healthy condition, as determined by the County, at the end of the guarantee period.

3.05 REPLACEMENT

A. At the end of the guarantee period, any plant required under this Contract that is dead or not in satisfactory growth as determined by the County, shall be removed. Plants replaced shall be guaranteed for 90 days after date of replacement.

B. Replacement of plants necessary during guarantee period shall be the responsibility of the Contractor, except for possible replacements of plants resulting from removal, vandalism, acts of neglect on the part of others, or acts of God.

C. All replacements shall be plants of the same kind and size as specified in the Drawings. They shall be furnished and planted as herein specified. The cost shall be the responsibility of the Contractor.

END OF SECTION

SECTION 02615 DUCTILE IRON PIPE AND FITTINGS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials, equipment and incidentals required to install ductile iron pipe and restrained joint ductile iron pipe and cast iron or ductile iron restrained joint fittings, complete, as shown on the Drawings and specified in these Standards.

B. Fittings are noted on the drawings for the Contractor's convenience and do not relieve him from laying and jointing different or additional items where required.

C. The Contractor shall furnish all labor, materials, equipment and incidentals required to install push-on joint or restrained joint ductile iron pipe, complete as shown on the Drawings and Specifications.

D. Newly installed pipe shall be kept clean and free of all foreign matter. All DI pipe installed underground shall be poly wrapped unless noted otherwise on the plans.

1.02 SUBMITTALS

A. The Contractor shall submit to the County, within ten days after receipt of Notice to Proceed, a list of materials to be furnished, the names of the suppliers and the appropriate shop drawings for all ductile iron pipe and fittings.

B. The Contractor shall submit the pipe manufacturer's certification of compliance with the applicable sections of the Specifications.

PART 2 PRODUCTS

2.01 MATERIALS

A. Ductile iron pipe shall conform to AWWA C150 and AWWA C151. Pipe shall be Pressure Class 350. All ductile iron pipe used in above ground applications shall be Special Thickness Class 53. All pipe materials used in potable water systems shall comply with NSF Standard 61.

B. Unrestrained joint pipe shall be supplied in lengths not to exceed 21 ft. and shall be either the rubber-ring compression-type push-on joint or standard mechanical joint pipe as manufactured by the American Cast Iron Pipe Company, U.S. Pipe and Foundry Company, or an approved equal.

C. All mechanical joint fittings shall be pressure rated for 350 psi for sizes 4-24 inches and 250 psi for sizes 30 inches and larger. All flanged fittings shall be pressure rated for 250 psi for all sizes. All fittings shall meet the requirements of AWWA C110 or AWWA C153.

D. Rubber gaskets shall conform to AWWA C111 for mechanical and push-on type joints and shall be Ethylene Propylene Diene Monomer (EPDM) rubber for potable water and reclaimed water pipelines. Standard gaskets shall be such as Fastite as manufactured by American Cast Iron Pipe Company, or an approved equal. Acrylonitrile butadiene (NBR) gaskets shall be used for potable water mains that are located in soil that is contaminated with low molecular-weight petroleum products or non-chlorinated organic solvents or non-

aromatic organic solvents. Fluorocarbon (FKM) gaskets shall be used for potable water mains that are located in soil that is contaminated with aromatic hydrocarbons or chlorinated hydrocarbons. Fluorocarbon (FKM) gaskets shall be used where both classes of contaminates are found.

E. Water Main and Reclaimed Water Main Coatings: All ductile iron pipe used in water and reclaimed water systems shall have a standard thickness cement lining on the inside in accordance with AWWA C104 and a standard 1-mil asphaltic exterior coating per AWWA C151. All ductile iron or gray iron fittings used in water and reclaimed water systems shall have standard thickness cement linings on the inside per AWWA C104 and an asphaltic exterior coating or they shall have factory-applied fusion bonded epoxy coatings both inside and outside in accordance with AWWA C550.

F. Wastewater Main Coatings: All ductile iron pipe and fittings used in wastewater sewer systems shall have a factory applied dry film thickness 40-mil Protecto 401 or 40-mil Novocoat SP2000W amine cured novalac ceramic epoxy lining on the inside. The interior lining application is to be based on the manufacturer's recommendation for long-term exposure to raw sewage. To ensure a holiday-free lining, documentation must be provided, prior to shipment, showing each section of lined pipe has passed holiday testing at the time of production per ASTM G62. The lining shall have a minimum one year warranty covering failure of the lining and bond failure between liner and pipe.

Exterior coatings for ductile iron pipe and fittings used in wastewater systems shall be either an asphaltic coating per AWWA C151 or a factory-applied epoxy coating per AWWA C550.

G. Thrust restraint devices shall be provided at all horizontal and vertical bends and fittings, in casings under roads and railroads and at other locations specifically indicated on the construction drawings.

Thrust restraint devices shall be either concrete thrust blocks or restraining glands as manufactured by Star Pipe Products, Stargrip 3000 and 3100, Allgrip 3600, or as manufactured by EBAA Iron Sales, Megaflange, 2000 PV, or other approved equal restraining gland products.

Factory restrained joints shall be Flex-Ring manufactured by American Cast Iron Pipe Company, TR Flex manufactured by US Pipe, or an approved equal.

Restrained joint designs that use a restraining gasket shall use Amarillo Fast Grip Gaskets (yellow) as manufactured by American Cast Iron Pipe Co., Barracuda (orange) manufactured by Specification Rubber Products, Inc., or an approved equal. Any restraining gasket shall be EPDM rubber and shall have color inherent with the rubber. Color shall not be attained by surface coating.

All T-bolts, bolts, nuts, washers, all thread, and hardware shall be stainless steel.

Restrained joints, where used, shall be installed at bend and fitting locations and at pipe joint locations both upstream and downstream from the bends or fittings at distances as required by these Standards. Restrained joint pipe fittings shall be designed and rated for the following pressures:

350 psi for pipe sizes up to and including 24" diameter
250 psi for pipe sizes 30" diameter and above

2.02 DETECTION

A. Pipe shall have a 3-inch wide warning tape of the proper color placed directly above the pipe 12 inches below finished grade or a 6-inch warning tape between 12 inches and 24 inches below finished grade.

B. Pipe shall have a solid, 10 gauge, high strength, copper clad steel wire with a polyethylene jacket of appropriate color installed along the pipe alignment as detailed in these standards. Tracer wire shall be manufactured by Copperhead Industries or Manatee County approved equal.~~Pipe shall have a No. 10 gauge solid, insulated wire of proper color installed along the pipe alignment as detailed in these standards.~~

2.03 IDENTIFICATION

A. Each length of pipe and each fitting shall be marked with the name of the manufacturer, size and class, lining type, and shall be clearly identified as ductile iron pipe. All gaskets shall be marked with the name of the manufacturer, size and proper insertion direction.

B. All ductile iron pipe 12 inches and smaller shall be entirely polyethylene-wrapped blue for water mains, purple (Pantone 522 C) for reclaimed water mains and green for sewer mains, per AWWA C105.

C. All ductile iron pipe greater than 12 inches shall be spiral wrapped with color coded polyethylene at a six-inch minimum spacing, If soil testing, in accordance with AWWA C105, indicates that the soil at the site is corrosive, the ductile iron pipe shall be entirely polyethylene-wrapped with color coded polyethylene.

D. Poly-wrap shall be by V-BioTM Enhanced Polyethylene Encasement (or equivalent).

E. All above ground potable water mains and appurtenances shall be painted safety blue.

F. The finish paint color for the potable water and dry force main piping systems to be installed on the new bridge shall match the new bridge color. Refer to specification Section 09900, Painting, for additional information.

END OF SECTION

SECTION 02616 DISINFECTING POTABLE WATER PIPE LINES

PART 1 GENERAL

1.01 SCOPE OF WORK

The Contractor shall furnish all labor, materials, equipment and incidentals required to clean and disinfect potable water pipe lines. This work is required to place all types of pipe into service as potable water lines.

1.02 CLEANING WATER MAINS

At the conclusion of the work, the Contractor shall thoroughly clean all of the new pipes to remove all dirt, stones, pieces of wood or other material which may have entered during the construction period per Section 02618.

1.03 DISINFECTING & BACTERIOLOGICAL TESTING OF POTABLE WATER PIPE LINES

A. All record drawing requirements must be submitted to the County prior to starting the bacteriological testing of the water lines.

B. After the new potable water pipelines have been hydrostatically tested, or after existing potable water pipelines have been modified or repaired, they shall be cleaned, disinfected and sampled and tested for the presence of coliform organisms in accordance with AWWA C651.

C. The County Inspector shall have been notified and shall be present at the time of the introduction of the chlorine disinfectant and water from the supply system into the main.

D. At the end of the chlorine contact period, the chlorine residual shall be determined by sampling and testing, and the results shall be reported to the regulatory agencies with the County and State. The pipelines shall then be flushed thoroughly with clean potable water until chlorine measurements show that the concentration is no higher than the chlorine concentration that is acceptable for domestic use.

E. Discharge flows from cleaning or flushing operations, and heavily chlorinated water from disinfecting operations, shall be disposed of in a manner consistent with US EPA, FDEP and SWFWMD regulations. Chapter 62-302 F.A.C. water quality standard for residual chlorine in Class III waters is <0.01 mg/L (ppm).

F. After final flushing and before the new main is connected to the distribution system, sampling and analysis of the replacement water shall be performed by an approved laboratory or by the Department of Health. Sampling locations shall be as required by AWWA C651 or as determined by the FDEP representative. Pipelines that are tested and return an unsatisfactory test result shall be reflushed and resampled, or redisinfected, or otherwise reconditioned, until a satisfactory result is attained.

G. No potable water main shall be placed into service until the results of the bacteriological tests are satisfactory and the FDEP has provided the County with a written letter of acceptance. Potable water services, fire service, and fire hydrant leads that are exempt from a permit from the FDEP but still require bacteriological sampling in accordance with Chapter 62-555, Florida Administrative Code, shall not be placed into service until the results of the

bacteriological tests are satisfactory and the Manatee County Public Works Engineering Department has provided written acceptance.

H. Special disinfecting procedures when approved by the County, may be used where the method outlined above is not practical.

END OF SECTION

SECTION 02617 INSTALLATION AND TESTING OF PRESSURE PIPE

PART 1 GENERAL

Reference Section 1.9, Installation of Pipelines in the Manatee County Public Works Utility Standards Part 1-Utility Standards Manual.

1.01 GENERAL

A. Furnish and install pipe, fittings, valves, fire hydrants, services, and all other appurtenances and incidentals complete and in-place as required by the construction drawings.

B. Where potable or reclaimed water mains are to be installed under pavement, in parking lots, etc., the main shall be DI or protected by a steel casing pipe.

C. All pipe crossing state or federal roads or local arterials & thoroughfares shall be installed in a casing pipe.

D. Services under any kind of pavement shall be Type “L” copper or Schedule 40 stainless steel.

E. Water mains 16-inches and larger shall be ductile iron. High density polyethylene or PVC (for 16” only). The use of HDPE pipe must be authorized by the County prior to ordering and installation.

F. Soil testing in accordance with AWWA C105 shall be performed during the design phase to determine if the soil is corrosive to ductile iron pipe. One (1) soil test shall be performed for pipe lengths under 500 lineal feet, with an additional soil test every 500 of additional ductile iron pipe to be installed. The soil testing shall be performed by a Florida licensed geotechnical engineering and signed and sealed report shall be supplied to the County for review prior to installation of the ductile iron pipe for evaluation. The soil testing results shall be used to determine if additional requirements for the installation of ductile iron pipe and/or the restrained joints is warranted.

G. Ductile iron pipe, with gasket materials as required in these Standards, shall be used in soil that is contaminated with low molecular-weight petroleum products, aromatic hydrocarbons, chlorinated hydrocarbons or organic solvents.

H. Trees shall not be planted or located within 10 feet of any potable water main, reclaimed water main, sanitary force main or gravity sanitary sewer main that is owned and maintained by County. With prior approval, an approved root barrier may be used with 5 feet of clearance.

I. All distribution waterlines that enter private property become private lines and shall have a back-flow preventer installed at the right-of-way. BFP can be part of a meter assembly or a BFP / detector check assembly.

J. Installation tolerances of Pipe Lines:

1. Direct Bury:

a. Vertical Alignment = ±0.5 feet

b. Horizontal Alignment = ±1.0 feet

2. Horizontal Directional Drill (Trenchless Technologies):

a. Vertical Alignment:

1) max. slope shall not exceed 2% (2.0 feet within a length of 100 feet).
2) No reverse curvature within 200 feet
3) No vertical deviation greater than ten (10) percent of the proposed depth of cover at that specific station.

b. Horizontal Alignment:

1) max. rate of deviation shall not exceed 1.5% (1.5 feet within a length of 100 feet
2) No reverse curvature
3) Total deviation not to exceed 2.0 feet

1.02 HANDLING AND STORAGE

A. Prior to installation, all pipe and fittings shall be inspected. Cracked, broken, or otherwise defective materials not in compliance with these standards shall not be used and shall be removed from the project site.

B. The pipeline installer shall take care in the handling, storage and installation of the pipe and fittings to prevent injury to the materials or coatings. Use proper implements, tools and facilities for the safe and proper protection of the work. Lower the pipe and fittings from the truck to the ground and from the ground into the trench in a manner to avoid any physical damages. Under no circumstances shall the pipe or fittings be dropped onto the ground or into the trenches.

C. The pipeline installer shall not distribute material on the job site faster than it can be used to good advantage. Unless otherwise approved by the County, installer shall not distribute more than one week's supply of material in advance of laying. Any materials not to be installed within two weeks of delivery shall be protected from the sunlight, atmosphere and weather by suitable enclosures or protective wrapping until ready for installation. Stored PVC pipe shall be placed on suitable racks with bottom tiers raised above the ground to avoid damage. Storage of pipe on the job site shall be done in accordance with the pipe manufacturer's written instructions.

1.03 SURVEY MARKINGS

A. As a marker for the Surveyor, a PVC pipe marker or 2" x 4" marker shall be inserted by the Contractor on the top of pipe for potable water mains, reclaimed water mains and sanitary force mains at intervals no greater than 200 feet apart and at locations where there is a substantial grade change. The pipe markers shall indicate the pipe diameter and shall be labeled PWM in "safety" blue, RWM in purple, and FM in green, for potable water mains, reclaimed water mains and sanitary force mains, respectively. The Contractor is responsible for making the aforementioned markers available to the Surveyor. The Contractor shall field locate the mains and fittings when markers are not made available to the Surveyor.

B. As a marker for the Surveyor, a PVC pipe marker or 2" x 4" marker shall be inserted by the Contractor on the top of all pipe fittings (other than sanitary sewer service wyes, potable water saddles and reclaimed water saddles). The markers for fittings shall indicate the type of fitting and shall be labeled PWF in "safety" blue, RWF in purple, and FMF in green, for

potable water fittings, reclaimed water fittings, and sanitary force main fittings, respectively. The Contractor is responsible for making the aforementioned markers available to the Surveyor. The Contractor shall field locate the mains and fittings when markers are not made available to the Surveyor.

C. A PVC pipe marker or 2" x 4" marker shall be inserted by the Contractor at the beginning and end of each horizontal directional drill (HDD). The HDD Contractor shall provide a certified report and bore log indicating the horizontal and vertical location every 25 linear feet or less along the pipe.

D. A 2" PVC pipe marker with a painted end cap shall be inserted by the Contractor at the ROW line indicating each individual new service location or stub out. The marker shall be a 6 foot length of PVC pipe inserted 2 feet into the ground and shall be painted "safety" blue for potable water, purple for reclaimed water, and green for sewer.

1.04 PROCEDURE FOR TESTING WATER LINES, FORCE MAINS AND RECLAIMED WATER LINES

A. A 48-hour notice is needed prior to testing. A letter stating the reasons testing should be scheduled ahead of other jobs must accompany all emergency testing requests.

B. County and Contractor must be present for all testing, except for testing tapping valves and sleeves.

C. HYDROSTATIC TESTING

1. Refer to Manatee County Public Works Utility Standards Part 1-Utility Standards Manual Section 1.8.7.

1.05 INSPECTION/TESTING PROCEDURE COVERING BORED PIPE LINES OR CASING AND CONDUITS INSTALLED ACROSS PREVIOUSLY TESTED AND/OR COUNTY ACCEPTED WATER AND SEWER PIPE WITHIN DEVELOPMENT PROJECTS UNDER ACTIVE CONSTRUCTION

A. Prior to testing water and sewer lines, every effort will be made to install sleeves for underground utilities that will cross these water and sewer lines or services.

B. Where it has not been possible to pre-install sleeves prior to testing and bores or conduits are required, it is the responsibility of the utility company and/or their Contractor performing the work to provide Manatee County Utility Operations Department or the Engineer of Record with accurate horizontal and vertical as-built information of the sleeves, bores and conduits installed by said utility company. This applies to all bores and conduits crossing water and sewer lines.

C. Procedures to be followed for installation of conduits, pipe lines and bores that will cross, or be closer than 5'-0" horizontally and 18 inches vertically to, <u>previously tested water and sewer lines that are still under the ownership of the developer/contractor</u>.

1. Notify the County and obtain the best as-built information available. Allow sufficient time for the County to field locate the existing pipe lines.
2. Submit drawings of proposed location to the County and Manatee County Utility Operations Dept. Utility Locations Section for review.
3. Obtain a County Right-of-Way Use Permit if the work area is within a dedicated area of right-of-way.

4. Perform installation in the presence of a County representative. Call (941) 792-8811, ext. 5061 or ext. 5069 with at least two (2) working days notice.
5. Submit two (2) copies of as-built information to the County to incorporate into the record drawings to be submitted to the County.
6. Failure to follow steps 2) thru 5) will result in additional charges for retesting the previously tested water and sewer lines.

D. Procedures to be followed for installation of conduits, pipe lines and bores crossing or closer than 5'-0" horizontally and 18 inches vertically to previously tested water and sewer lines that have been previously accepted by Manatee County:

1. Obtain record drawing information from the County.
2. If roadway has been dedicated to Manatee County, obtain Right-of-Way Use Permit and copy the Project Management Department Locations Section with proposed location drawing.
3. Follow procedures in "Sunshine State One-Call", paying special attention to the requirements of Section VII.

E. Should water or sewer lines be damaged during the bore pipe line or casing installation, the cost of any repairs and retesting will be paid for by the utility company that installed the bore. The actual clearance between a bored casing crossing a water or sewer pipe should not be less than 18 inches.

1.06 DETECTION

A. Direct buried pipe shall have 3" detectable metallic tape of the proper color placed directly above the pipe and 12" below finished grade or 6" detectable tape between 12" and 24" below finished grade.

B. Direct buried or horizontal directional drilled non-metalic pipe shall also have tracer wire installed along the pipe alignment. The tracer wire to be used shall be a solid, 10 gauge, high strength, copper clad steel wire with a polyethylene jacket of appropriate color manufactured by Copperhead Industries or Manatee County approved equal.

END OF SECTION

SECTION 02618 PIPELINE CLEANING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials, equipment and incidentals required to clean all new lines 4" and larger, and existing pipelines as specified in this specification and as indicated on the Drawings.

B. This work shall include the furnishing and installation of all pig launching and retrieval devices and the appropriate pigs for the cleaning procedure, and all necessary excavations, shutdowns, fittings and valves required.

1.02 RELATED WORK

A. The contractor is responsible for all necessary supply water.

B. The contractor is responsible for all necessary bypass pumping.

C. The contractor is responsible for the proper disposal of any materials removed from the pipe lines as a result of the cleaning procedure.

1.03 SUBMITTALS

A. The Contractor shall submit prior to construction, a cleaning plan, Shop Drawings, and layout diagram for approval to the County.

B. The Contractor shall submit to the County a list of materials to be furnished, and the names of suppliers.

1.04 QUALIFICATIONS

A. The Contractor performing this work shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner.

B. The Contractor shall also be capable of providing crews as needed to complete this work without undue delay.

C. The County reserves the right to approve or disapprove the Contractor, based on the submitted qualifications.

PART 2 PRODUCTS

2.01 GENERAL

A. The contractor shall be responsible for furnishing pigs in sufficient numbers and sizes, of appropriate densities, coatings and configurations to properly clean the piping systems.

B. All pigs used for the cleaning of sewer or reclaimed water lines shall not be used in the cleaning of potable water lines.

2.02 MATERIALS

A. The pig launching and retrieval equipment shall be of the latest design and construction and shall include the means to maintain constant monitoring of the in-line flows and pressures of the system being cleaned and the constant location of the cleaning pigs in the system. Launching and retrieval systems shall be fabricated, designed and manufactured according to ANSI standards and capable of withstanding working pressures of 150 psi. Launching and receiving devices shall be sized one diameter larger than the system to which it will be attached with a minimum length of 2.5 times the diameter.

B. The contractor shall have available for immediate use an electronic pig detector for use in the system being cleaned to provide a means of tracking the passage of the pig in the system to locate areas of potential or suspected blockage and other disparities in the system.

C. The pig shall be constructed of elastomer polyurethane with an open cell construction and a density equal to or suitable for use in the piping system being cleaned. Pig configuration shall consist of a parabolic nose with a concave base and coated with a resilient surface material that will maintain a peripheral seal and will effectively clean the piping system without over abrading the interior pipe wall. Pig characteristics shall include the ability to navigate through 90 degree bends, 180 degree turns, bi-directional fittings, full port valves, reduce its cross sectional area and return to its original design configuration and be propelled by hydraulic pressure.

PART 3 EXECUTION

3.01 PIPELINE CLEANING

A. The cleaning of the pipe line shall be done by the controlled and pressurized passage of a polyurethane pig of varying dimensions, coatings and densities as determined by the County through the piping system.

B. A series of pigs shall be entered into the system at a point as near to the beginning as is logistically and mechanically feasible.

C. A launching assembly shall be used as the entrance point for the pig. This assembly shall allow for the following:

1. The entering of pigs into the system by providing the means to induce flow from an external source, independent of the flows and pressures immediately available from the system, on the back of the pig to develop sufficient pressure to force the pig through the system.
2. A means to control and regulate the flow.
3. A means to monitor the flows and pressures.
4. A means to connect and disconnect from the system without any disruption to the operation of the system.

D. The pig shall be removed or discharged from the system at a point as near to the end as is logistically and mechanically feasible.

E. The contractor shall be responsible for the retrieval of the pig at the discharge point. This may include setting a trap that will not disrupt normal flow and operations but will capture the pig and any debris. A retrieval assembly may also be used but said assembly shall be

able to connect and disconnect from the system without any disruption to the operation of the system.

F. Alternative launching and retrieval methods shall be done with the prior approval of the County.

G. Any pig that cannot progress through the piping system shall be located by the contractor and removed by excavation of the pipe in order to remove the blockage. All pipe repairs shall be the responsibility of the contractor and shall be performed with as little disruption to the system as possible.

H. Any increase in pressure that cannot be accounted for, i.e. fittings or valves or additional cleaning runs, shall be investigated, per the Engineers' approval, by locating the pig at the beginning of the increased pressure and excavating to determine the cause of the pressure increase. All pipe repairs shall be the responsibility of the contractor and shall be performed with as little disruption to the system as possible.

I. Final flushing of the cleansed lines shall be performed after the last successful run of the pig as determined by the County. The contractor shall be responsible for all applicable flushing and disinfection requirements for potable water lines.

3.02 ACCEPTANCE

A. The contractor shall maintain and provide a report at the end of the cleaning procedure containing the following:

1. The pressures in the pipe during the pigging procedure.
2. Any inline problems encountered during the procedure including all excavations with detailed locations, reason for the excavation and any corrective measures taken to the pipeline.
3. A record of the pigs used, their sizes, styles and other pertinent information regarding what materials were used during the cleaning.
4. An analysis of the condition of the pipeline before and after the cleaning procedure.

END OF SECTION

SECTION 02619 HORIZONTAL DIRECTIONAL DRILLING

PART 1 GENERAL

1.01 SCOPE

The Contractor shall furnish all labor, materials, equipment and incidentals required to install all pipe, fittings and appurtenances as shown on the Drawings and specified in the Contract Documents by Horizontal Directional Drilling (HDD).

1.02 GENERAL

A. All existing structures, water and sewer lines, storm drains, utilities, driveways, sidewalks, signs, mail boxes, fences, trees, landscaping, and any other improvement or facility in the construction area that the Contractor disturbs for his own construction purposes shall be replaced to original condition at no additional cost to the County.

B. For “Navigable Waters of the U.S.” reference 33 of the Code of Federal Regulations, Part 329.

C. For “Waters of the U.S.” reference 33 of the Code of Federal Regulations, Part 323.

D. For “Waters of the State” reference Section 62-301 of the Florida Administrative Code.

1.03 TESTING

A. In place soil compaction tests shall be performed by a qualified testing laboratory.

B. Compaction tests shall be taken at every excavation, except in the road crossings or road shoulders; tests are to be taken according to current FDOT Standards.

C. All pipe shall be tested in accordance with the appropriate material specifications.

D. Reference Standards: American Society for Testing and Materials (ASTM), D1557, Moisture-Density Relations of Soils Using 10-lb. Rammer and 18-in. Drop.

E. The density of soil in place shall be a minimum of 95 percent in accordance with ASTM test 1557-70T, Method A or C.

1.04 QUALIFICATIONS

A. Pipe Manufacture: All pipe and fittings shall be furnished by a single manufacturer who is fully experienced, reputable and qualified in the manufacture of the items to be furnished.

B. Drilling Supervisor: The Contractor shall provide a competent boring specialist who shall remain on the project site during the entirety of the directional boring operation. This includes, but is not limited to, drilling fluid preparation, seaming, boring and pulling. The boring specialist shall have a minimum of five years of experience in supervising directional bores of similar nature, diameter, materials and lengths.

C. Pipe Fusion: All boring and fusing equipment shall be certified for operation. The Contractor responsible for thermal butt fusing pipe and fittings shall have manufacturer certification for performing such work or a minimum of five years of experience performing this type of work.

If no certification is available, written documentation of the required work experience shall be submitted for approval.

D. Drilling Fluid Specialist: The personnel responsible for supervising the supply, mixing, monitoring fluid quality, pumping and re-circulation system proposed for the drilling fluid shall have a written certification issued by the Drilling Fluid manufacturer for performing such work or a minimum of five years of experience performing this type of work. If no certification is available, written documentation of the required work experience for the proposed personnel shall be submitted for review and approval.

1.05 SUBMITTALS

A. Detailed description including specifications and catalog cuts for:

1. Shop drawings and catalog data for all HDD equipment.
2. The pipe manufacturer's maximum degree of radial bending allowed for the pipe when full and when empty and pullback force recommended setting.
3. Steering and tracking devices including specific tracer wire.
4. Drilling fluids; the drilling fluid submittal shall include the ratio of mixture to water, including any additives, based on the Contractor's field observations prior to construction, knowledge and experience with drilling in similar conditions, and any soil data provided in the Contract Documents, which shall be verified by the fluid specialist.
5. Shop drawings for the breakaway swivel, including the method of setting the swivels' break point and set point to be used.
6. Shop drawings for sizing of the mandrel for pull through testing
7. Pipe assembly procedure, details of support devices, and staging area layout including methods to avoid interference with local streets, driveways, and sidewalks.
8. Details of pipe fusion procedures and copies of the fusion technician qualification certification or documentation.
9. Drilling fluid technician qualification certification or documentation

B. If the Contractor proposes any changes to the pull-back distance or profile shown on the drawings, he may be required to submit a complete design for the proposed pipe including an analysis for pull-back forces, external loads including full hydrostatic pressure if empty, external forces due to borehole collapse, ovalization during pull-back, thermal stress while exposed to Sun-light, shortening after release of pull-back force, and tensile stress during pull-back.

C. Bore Plan: For all contiguous piping installations over 300 feet in length or any installations for piping larger than 4" in diameter, the Contractor shall submit a Bore Plan that includes the following:

1. Contact information and experience for the drilling fluid specialist.
2. The number of passes the bore will include to get the product pipe installed.
3. The pilot bore and all reaming bore sizes including the final pullback with the product pipe.
4. Drilling rod length in feet.
5. The pilot bore, pre-ream bores (if any) and pullback production rate in minutes per (drilling) rod to maintain adequate mud flow.
6. Details of the entry and exit pit locations along with entry and exit angles for the bore, drawn to scale, depicting the position of all required equipment, access points, existing facilities to remain in place, existing traffic lanes to be maintained in

operation, office trailers and storage sites.

7. The method of fusing or joining pipe of adjacent bores to ensure that the joint is on grade with the installed pipe.

D. Furnish a Bore Path Report to the County within seven days of the completion of each bore path. Data collected by the County Representative does not relieve the Contractor from the responsibility of recording his own data. Include the following in the report:

1. Location of project, project name and number
2. Name of person collecting data, including title, position and company name
3. Investigation site location (Contract plans station number or reference to a permanent structure within the project right-of-way)
4. Driller's Log & identification of the detection method used
5. Elevations and offset dimensions of installed pipe as referenced to the drawings
6. Data log of pullback force during product pipe installation
7. All failed bores. Include length of pipe left in place and explanation of failed installation.

PART 2 PRODUCTS

2.01 MATERIALS

A. Incidental materials that may or may not be used to install the product depending on field requirements are not paid for separately and will be included in the cost of the installed product.

B. Drilling Fluids shall use a mixture of bentonite clay or other approved stabilizing agent mixed with potable water with a pH of 8.5 to 10.0 to create the drilling fluid for lubrication and soil stabilization. Vary the fluid viscosity to best fit the soil conditions encountered. Contractor shall have appropriate additives for drilling fluid available for different soil conditions that may be encountered. Do not use any other chemicals or polymer surfactants in the drilling fluid without written consent from the County. Certify to the County in writing that any chemicals to be added are environmentally safe and not harmful or corrosive to the product pipe.

C. For drilling operations that will be below waters of the State of Florida, only bentonite free drilling fluids shall be used. Acceptable products are BioMax, manufactured by M-I Swaco, Inc., P.O. Box 2216, Laurel, Mississippi 39440, Phone: (800) 731-7331 or Bio-Bore, manufactured by Baroid Drilling Fluids, Inc., P.O. Box 1675, Houston, Texas 77251, Phone: (731) 987-5900 or approved equal.

D. Identify the source of water for mixing the drilling fluid. Approvals and permits are required for obtaining water from such sources as streams, rivers, ponds or fire hydrants. Any water source used other than potable water may require a pH test.

E. The tracer wire to be used for all directional drills shall be a solid, 10 gauge, high strength, copper clad steel wire with a polyethylene jacket of appropriate color manufactured by Copperhead Industries or Manatee County approved equal.

F. Breakaway connectors shall be supplied by DCD Design & Manufacturing, Condux International, Inc. or approved equal.

PART 3 EXECUTION

3.01 SITE CONDITIONS

A. Carry out excavation for entry, exit, recovery pits, slurry sump pits, or any other excavation as specified in the Contract documents. Sump pits are required to contain drilling fluids if vacuum devices are not operated throughout the drilling operation, unless approved by the County.

B. Within 48 hours of completing installation of the boring product, clean the work site of all excess slurry or spoils. Take responsibility for the removal and final disposition of excess slurry or spoils. Ensure that the work site is restored to pre-construction conditions or as identified on the plans.

C. Exposure of product pipe to sunlight shall be limited to 14 consecutive days unless approved by the County.

D. The pipe shall be supported at intervals along its length with rollers or Teflon pads to minimize frictional forces when being pulled, and to hold the pipe above the ground. Surface cuts or scratches greater than or equal to the maximum defect depth in 3.08 E are not acceptable.

3.02 DAMAGE RESTORATION & REMEDIATION

A. The Contractor shall take responsibility for restoration for any damage caused by heaving, settlement, separation of pavement, escaping drilling fluid (frac-out), or the directional drilling operation, at no cost to the County.

B. When required by the County, provide detailed plans which show how damage to any roadway facility will be remedied. These details will become part of the Record Drawings Package. Remediation Plans must follow the same guidelines for development and presentation of the Record Drawings. When remediation plans are required, they must be approved by the County before any work proceeds.

C. For HDD operations that will be below waters of the State of Florida, the contractor shall be responsible for any damage caused by the drilling operation, including, but not limited to, fracturing of the channel bottom. Any State or Federal required environmental cleanup due to the release of drilling fluids into State waters shall be at the Contractor's expense. The Contractor may at his own expense increase the depth of his drilling operations upon the approval from the County.

3.03 QUALIFICATIONS FOR REJECTION OF DIRECTIONAL BORE

A. The County may reject any portion of the work that is deemed to be non-responsive to the Contract requirements or not in conformance with approved plans and submittals, and for other factors including the following:

1. Failed Bore: When there is any indication that the installed product has sustained damage, stop all work, notify the County and investigate damage. The County may require a pressure and / or mandrel test at no additional cost to the County and shall have a County representative present during the test. Perform all testing within 24 hours unless otherwise approved by the County. Furnish a copy of the test results and all bore logs to the County for review and approval. The County is allowed up to

5 working days to approve or determine if the product installation is not in compliance with the specifications.

2. Obstructions: If an obstruction is encountered during boring which prevents completion of the installation in accordance with the design location and specification, the pipe may be taken out of service and left in place at the discretion of the County.
3. Pull-back Failure: If the installed breakaway device should fail during pull back.
4. Loss of Drilling Fluids: If the drilling fluid is "lost" during the pull back of the product and cannot be regained within the required timeframe of the manufacturer or if more than a reasonable amount of fluid is used to fill an unknown void and flow cannot be regained. No pipe shall be pulled without visible flow of drilling fluid.
5. Test Failure: If the pipe shall fail a hydraulic pressure test or mandrel test as specified by the County.
6. Damaged Pipe: If at any time when the product is pulled back and any exposed areas have a greater than allowable "gouging" or visible marring of the pipe per the table in 3.08 E.
7. Alignment Tolerance Exceeded: If the vertical and horizontal limits are not within tolerances.
8. Defective Material: Any other defect in material or workmanship which would affect the quality, performance, or installation life of the installed pipeline.

B. Remediation: All rejected bores shall be at the Contractors expense to correct and provide a satisfactory installed product. The Contractor shall submit to the County a revised installation plan and procedure for approval before resuming work. The County may require non-compliant installations to be filled with excavatable flowable fill or to be completely removed at no additional cost to the County.

3.04 PRODUCT LOCATING AND TRACKING

A. The County recognizes walkover, wire line, and wire line with surface grid verification, or any other system as approved by the County, as the accepted methods of tracking directional bores. Use a locating and tracking system capable of ensuring that the proposed installation is installed as intended. The locating and tracking system must provide information on:

1. Clock and pitch information
2. Depth
3. Transmitter temperature
4. Battery status
5. Position (x,y)
6. Azimuth, where direct overhead readings (walkover) are not possible (i.e. sub aqueous)

B. Ensure proper calibration of all equipment before commencing directional drilling operation.

C. Prepare the Driller's Log. Take and record alignment readings or plot points such that elevations on top of and offset dimensions from the center of the product to a permanent fixed feature are provided. Such permanent fixed feature must have prior approval of the County. Provide elevations and dimensions at all bore alignment corrections (vertical and horizontal) with a minimum distance between points of 10 feet. Provide a sufficient number of elevations and offset distances to accurately plot the vertical and horizontal alignment of the installed product.

D. Installation Location Tolerances:

a. It shall be the Contractors responsibility to notify the County when the pilot bore activities are taking place. The Contractor shall provide the County a printout of the completed pilot bore path for review prior to pull back of the product.

b. The location of the initial bored hole shall be deemed acceptable by the County if the deviations of the bore from the design alignment or approved adjustments do not exceed the following tolerances:

1. Profile (vertical):
   a. 2.0 feet over the length of the drill.
   b. No reverse curvature within 200 feet.
   c. No vertical deviation greater than ten (10) percent of the proposed depth of cover at that specific station.

2. Alignment (horizontal):
   a. max. rate of deviation shall not exceed 1.5% (1.5 feet within a length of 100 feet).
   b. No reverse curvature.
   c. Total deviation not to exceed 2.0 feet.

c. If the pilot bore does deviate from the above criteria, the Contractor shall notify the County prior to pull back. The County, at its discretion, may require the Contractor to pull back and re-drill the pilot bore to correct any deviations.

~~The location of the initial bored hole shall be deemed acceptable by the County if the deviations of the bore from the design alignment or approved adjustments do not exceed the following tolerances:~~

~~1. Profile:~~
   ~~a. 2.0 feet within a length of 100 feet~~
   ~~b. No reverse curvature within 200 feet~~
   ~~c. Total deviation not to exceed 5 feet~~
~~2. Alignment:~~
   ~~a. 3.0 feet within a length of 200 feet~~
   ~~b. No reverse curvature~~
   ~~c. Total deviation not to exceed 7.0 feet~~

3.05 PRODUCT BORE HOLE DIAMETER

Minimize potential damage from soil displacement/settlement by limiting the ratio of the bore hole to the product size. The size of the back reamer bit or pilot bit, if no back reaming is required, will be limited relative to the product diameter to be installed as follows:

Table 2-1. Recommended Relationship between Product Diameter and Reamed Diameter

Product Diameter	Reamed Diameter
< 8”	Diameter of product + 4”
8” - 24”	Diameter of product x 1.5
> 24”	Diameter of product + 12”
*Horizontal Directional Drilling Good Practices Guidelines - HDD Consortium	

3.06 EQUIPMENT REQUIREMENTS

A. The HDD equipment selected by the Contractor shall be capable of drilling, steering, tracking, reaming and installing the pipeline through all the subsurface conditions that may be present at the site.

B. Match equipment to the size of pipe being installed. Obtain the County's approval for installations differing from the above chart. Ensure that the drill rod can meet the bend radius required for the proposed installation.

C. All HDD equipment shall have an electronic data logger to record pull back force during all pipe installations.

D. All HDD equipment that has the capability to exceed the maximum recommended pulling force shall have a breakaway swivel properly attached to the product pipe that will release if the pullback force exceeds the pipe manufacturers recommended pulling force.

3.07 THRUST / PULLBACK REQUIREMENTS

The Contractor shall provide as part of the required working drawings submittal complete data regarding the operational and maximum thrust or pulling forces to be used for the initial drill head and back-reamer installations, and the final pull-back of the pipe. Gages or other measurement tools shall be used to monitor the forces being used.

3.08 INSTALLATION PROCESS

A. Ensure adequate removal of soil cuttings and stability of the bore hole by monitoring the drilling fluids such as the pumping rate, pressures, viscosity and density during the pilot bore, back reaming and pipe installation. Relief holes can be used as necessary to relieve excess pressure down hole. Obtain the County's approval of the location and all conditions necessary to construct relief holes to ensure the proper disposition of drilling fluids is maintained and unnecessary inconvenience is minimized to other facility users.

B. The Contractor shall determine the pull-back rate in order to allow the removal of soil cuttings without building excess down-hole pressure and to avoid local heaving, or spills. Contain excess drilling fluids at entry and exit points until they are recycled and separated from excavated materials, or removed from the site or vacuumed during drilling operations. Ensure that entry and exit pits and storage tanks are of sufficient size to contain the expected return of drilling fluids and soil cuttings. The bored hole shall always be maintained full of drilling fluids for support of surfaces, and the fluid re-circulation equipment shall operate continuously until the pipe installation is completed and accepted by the County.

C. Ensure that all drilling fluids are disposed of or recycled in a manner acceptable to the appropriate local, state, or federal regulatory agencies. When drilling in suspected contaminated ground, test the drilling fluid for contamination and appropriately dispose of it. Remove any excess material upon completion of the bore. If in the drilling process it becomes evident that the soil is contaminated, contact the County immediately. Do not continue drilling without the County's approval.

D. The timing of all boring processes is critical. Install a product into a bore hole within the same day that the pre-bore is completed to ensure necessary support exists. Once pullback operations have commenced, the operation shall continue without interruption until the pipe is completely pulled into the borehole.

E. All prepared pipe that is being used for installation shall be adequately supported off the ground along the entire length to avoid damaging of the material during pullback due to ground surface conditions. Surface cuts or scratches greater than or equal to the maximum defect depth are not acceptable.

Pipe Size In.	Max. Defect Depth In.
4	1/16
6	1/11
8	5/32
10	3/16
12	1/4
> 12	Per Pipe Manufacturer's Recommendations

F. The drilling fluid specialist shall remain on the project site during the entirety of the directional boring operation to ensure proper mixture and production of drilling fluids needed for the bore.

G. Upon successful completion of the pilot hole, the borehole shall be reamed to a minimum of 25 percent greater than the outside diameter of the pipe being installed.

H. For bores with more than two radii of curvature (entrance and exit), the borehole should be reamed up to 50 percent larger than the outside diameter of the carrier pipe. Prereaming may be necessary dependent on size of material to be pulled.

I. Additional passes for prereaming may be required for larger pipe. Incremental increases shall be used as needed until appropriate bore hole size has been achieved.

J. Prereaming must be accomplished with no product attached to the reamer head on all bore pipe 6" and larger. The bore product maybe pulled back on final pass of prereaming upon prior approval from the County.

K. After reaming the borehole to the required diameter, the pipe shall be pulled through the hole. In front of the pipe shall be a breakaway swivel and barrel reamer to compact the borehole walls.

L. The Contractor shall not attempt to ream at a rate greater than the drilling equipment and drilling fluid system are designed to safely handle.

M. Install all piping such that their location can be readily determined by electronic designation (tracer wire) after installation.

1. For ~~non-conductive~~all pipe installations, externally attach two (2) tracer wires; see Section 2.01 – Materials, Part I. above, to the top of product pipe and secure in place with duct tape or 10-mil thickness polyethylene pressure sensitive tape at every joint and at 5 foot intervals.

N. Connect any break in the conductor line before construction with an electrical clamp, or

solder, and coat the connection with a rubber or plastic insulator to maintain the integrity of the connection from corrosion. Clamp connections must be made of brass or copper and of the butt end type with wires secured by compression. Soldered connections must be made by tight spiral winding of each wire around the other with a finished length minimum of 3 inches overlap. Tracking conductors must extend 2 feet beyond bore termini. Test conductors for continuity. Each conductor that passes must be identified as such by removing the last 6 inches of the sheath. No deductions are allowed for failed tracking conductors. Upon completion of the directional bore, the Contractor shall demonstrate to the County that the wire is continuous and unbroken through the entire run of the pipe by providing full signal conductivity (including splices) when energizing for the entire run in the presence of the County Representative. If the wire is broken, the Contractor shall repair or replace it at no additional cost to the County.

3.09 PIPELINE TESTING

A. HYDROSTATIC TESTING

1. Refer to Manatee County Public Works Utility Standards Part 1-Utility Standards Manual Section 1.8.7.

B. MANDREL DEFLECTION TESTING PROCESS

1. The deflection test for flexible pipe systems shall be performed by pulling a mandrel through the pipe line. The mandrel shall have a diameter equal to 80 percent of the inside diameter of the pipe system being tested. When the mandrel cannot be pulled through the pipe line the Contractor shall locate and correct the defect to the satisfaction of the County. After the defect is corrected and trench backfilled, the section of line shall then be retested to compliance.

2. Deflection tests shall be performed not sooner than ~~30 days~~24 hours after completion of ~~placement and densification of backfill~~the pipe pull-back. The pipe shall be cleaned and inspected for offsets and obstructions prior to testing.

3. The mandrel types that can be used are:
   a. a rigid, nonadjustable, odd number of legs (9 legs minimum), mandrel having an effective length not less than its nominal diameter; and (2) be fabricated of steel, fitted with pulling rings at each end, stamped or engraved on some segment other than a runner indicating the pipe material specification, nominal size and be furnished in a suitable carrying case labeled with the same data as stamped or engraved on the mandrel.

   b. ~~If approved by the County, a smaller diameter piece of similar pipe material that is approximately 3 feet long and meets the 80% reduction of the inside diameter of the pipe being tested.~~If approved by the County, a smaller diameter piece of similar pipe material that is approximately double the nominal diameter in length and meets the 80% reduction of the inside diameter of the pipe being tested. The pipe length may need to be adjusted to ensure the pipe section cannot become skewed and become lodged; this may cause the test to fail.

4. The mandrel shall be pulled through the pipe by hand to ensure that maximum allowable deflections have not been exceeded or that “necking” has not occurred. Prior to use, the mandrel shall be inspected by County personnel. Use of an unapproved mandrel or a mandrel altered or modified after inspection will invalidate

the test. If the mandrel fails to pass, the pipe will be deemed overdeflected or necked.

5. Overdeflected or necked pipe shall be abandoned and reinstalled. The replaced pipe shall be tested for deflection not sooner than ~~30 days~~24 hours after installation.

D. The following deficiencies in the flexible pipe system installation shall be corrected by the Contractor at no cost to the County:

1. Overdeflections
2. Stretched or "Necked" Pipe
3. Damaged Pipe
4. Improper Pipe Welds
5. Infiltration Points
6. Debris in the line

E. The County will not accept a credit, maintenance bond, or any other form of compensation in lieu of corrective measures that may be required to correct any sections of flexible pipe system that are improperly installed or do not meet the requirements of these specifications. In addition, all corrective measures proposed by the Contractor shall be approved by the County. In addition, should repairs of the flexible pipe system be accomplished by the use of any unauthorized materials or procedure, the County will require replacement of those substandard portions or repairs made to conform to the requirements of these specifications.

END OF SECTION

SECTION 02620 POLYETHYLENE (HDPE) PIPE AND FITTING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials, equipment and incidentals required to install polyethylene pressure pipe, fittings and appurtenances as shown on the Drawings and specified in the Contract Documents and these Standards.

B. Newly installed pipe shall be kept clean and free of all foreign matter & gouges.

C. All pipe shall be correctly color coded / identified.

1.02 QUALIFICATIONS

All polyethylene pipe, fittings and appurtenances shall be furnished by a single manufacturer who is fully experienced, reputable and qualified in the manufacture of the items to be furnished.

1.03 SUBMITTALS

A. The Contractor shall submit to the County, within ten days after receipt of Notice to Proceed, a list of materials to be furnished, the names of the suppliers and the appropriate shop drawings for all polyethylene pipe and fittings.

B. The Contractor shall submit the pipe manufacturer's certification of compliance with the applicable sections of the Specifications.

C. The Contractor shall submit shop drawings showing installation method and the proposed method and specialized equipment to be used.

PART 2 PRODUCTS

2.01 POLYETHYLENE PRESSURE PIPE

A. Polyethylene pipe 4" diameter and larger shall be high-density bimodal PE3408/PE 100/PE4710 polyethylene resin with a minimum cell classification of 445574 per ASTM D3350, Class 160, DR 11, Performance Pipe DriscoPlex 4000, or an approved equal, meeting the requirements of AWWA C906. All pipe materials used in potable water systems shall comply with NSF Standard 61. Outside diameters of water, reclaimed water and pressure sewer HDPE pipes shall be ductile-iron sizing system (DIPS).

B. Polyethylene pipe 3 inches in diameter (for potable water and reclaimed water), and 3 inches in diameter and smaller (for wastewater grinder pump force mains) shall be high-density PE 3408 polyethylene, per ASTM D2737, Pressure Class 160, iron pipe size (IPS) outside diameter, DR 11, Performance Pipe DriscoPlex 4100 or an approved equal, meeting the requirements of ASTM D 3035 and AWWA C901.

C. Polyethylene tubing 2 inches in diameter and smaller for potable water and reclaimed water shall be high density PE 3408 polyethylene resin per ASTM D2737, Pressure Class 200, Copper Tube Size (CTS), SDR 9, Performance Pipe DriscoPlex 5100, Endot EndoPure, Charter Plastics or an approved equal, meeting the requirements of AWWA C901. Butt

fusion or CTS brass connections shall be used. All pipe materials used in potable water systems shall comply with NSF Standard 61.

2.02 JOINTS

A. Where PE pipe is joined to PE pipe, it shall be by thermal butt fusion. Thermal fusion shall be accomplished in accordance with the written instructions of the pipe manufacturer and fusion equipment supplier. The installer of the thermal butt fused PE pipe shall have received training in heat fusion pipe joining methods and shall have had experience in performing this type of work.

B. Flanged joints, mechanical joints and molded fittings for 4" and larger pipe shall be in accordance with AWWA C906. Mechanical joints and fittings for 3" and smaller pipe & tubing shall meet the requirements of: AWWA C901, ASTM D 3350 and ASTM D 3140.

2.03 DETECTION

A. Direct buried HDPE pipe shall have 3" detectable metallic tape of the proper color placed directly above the pipe and 12" below finished grade or 6" detectable tape between 12" and 24" below finished grade.

B. Direct buried or horizontal directional drilled HDPE pipe shall also have tracer wire installed along the pipe alignment. The tracer wire to be used shall be a solid, 10 gauge, high strength, copper clad steel wire with a polyethylene jacket of appropriate color manufactured by Copperhead Industries or Manatee County approved equal.

2.04 IDENTIFICATION

A. Pipe shall bear identification markings in accordance with AWWA C906.

B. Pipe shall be color coded blue for water, purple (Pantone 522 C) for reclaimed water or green for pressure sewer using a solid pipe color or embedded colored stripes. Where stripes are used, there shall be a minimum of three stripes equally spaced.

PART 3 EXECUTION

3.01 INSTALLING POLYETHYLENE PRESSURE PIPE AND FITTINGS

All polyethylene pressure pipe shall be installed by direct bury, directional bore, or a method approved by the County prior to construction. If directional bore is used, or if directed by the County, the entire area of construction shall be surrounded by silt barriers during construction.

3.02 INSPECTION AND TESTING

All pipelines shall remain undisturbed for 24 hours to develop complete strength at all joints. All pipelines shall be subjected to a hydrostatic pressure and leak testing. Refer to Manatee County Public Works Utility Standards Part 1-Utility Standards Manual Section 1.8.7.

END OF SECTION

SECTION 02622 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS (AWWA SPECIFICATIONS C-900 & C-905)

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required to install the PVC piping, iron fittings and other appurtenances complete and ready for use as indicated on the construction drawings.

B. Provide and install complete all fittings and appurtenances not noted specifically on the construction plans as required to complete the utility system in accordance with these Standards.

1.02 DESCRIPTION OF SYSTEM

The Contractor shall install the piping in the locations as shown on the Drawings.

1.03 QUALIFICATIONS

All plastic pipe, fittings and appurtenances shall be furnished by a single manufacturer who is fully experienced, reputable, qualified and specializes in the manufacture of the items to be furnished. The pipe and fittings shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these Specifications.

1.04 SUBMITTALS

A. The Contractor shall submit shop drawings to the County including, but not limited to, dimensions and technical specifications for all piping.

B. The Contractor shall submit to the County, samples of all materials specified herein.

C. The Contractor shall submit and shall comply with pipe manufacturer's recommendation for handling, storing and installing pipe and fittings.

D. The Contractor shall submit pipe manufacturer's certification of compliance with these Specifications.

1.05 TOOLS

The Contractor shall supply special tools, solvents, lubricants, and caulking compounds required for proper installation.

PART 2 PRODUCTS

2.01 MATERIALS

A. Polyvinyl chloride (PVC) pressure pipe, 4 - 12 inches in diameter, shall be Class 235, DR 18, meeting the requirements of AWWA C900 used for potable and reclaimed water. Mains shall be cast-iron-pipe-equivalent outside diameters (also known as ductile iron pipe size (DIPS)). Each length of pipe shall be hydrostatically tested to four times its pressure class of the pipe by the manufacturer in accordance with AWWA C900.

B. Polyvinyl chloride (PVC) pressure pipe, 14 inches in diameter, shall be ductile iron pipe size (DIPS) outside diameter and shall meet the requirements of AWWA C905. Pipe used in water, sewer, and reclaimed water service shall be DR 18 and Pressure Class 235. Each length of pipe shall be hydrostatically tested at twice its pressure class in accordance with AWWA C905. Pipe shall be furnished in standard lengths of approximately 20 feet.

PVC pipe shall not be used for potable and reclaimed water mains 16 inches and larger.

C. Polyvinyl chloride (PVC) pressure pipe, 2-3 inches in diameter, shall be Pressure Rated 200, SDR21, conforming to ASTMD2241, and shall have Iron Pipe Size (IPS) outside diameters. SDR 21 PVC pipe 2-3 inches in diameter shall not be used for working pressures greater than 125 psi. PVC pipe shall not be used in applications, which require pipes that are less than 2 inches in diameter for wastewater force mains. PVC Pipe shall not be used in applications which require pipes that are less than 3 inches in diameter for potable water piping and reclaimed water piping.

D. Standard PVC pressure pipe joints shall be bell and spigot push-on type with elastomeric ring seals. Ring seal gaskets used at push-on joints shall conform to ASTM F 477 and shall be EPDM rubber for potable and reclaimed water pipes.

E. Lubricant furnished for lubricating the push-on joints in potable water pipes shall be nontoxic, water soluble, shall not support the growth of bacteria, shall have no deteriorating effects on the gasket or pipe material, and shall not impart color, taste, or odor to the water, and shall be an approved substance per NSF 61.

F. Thrust restraint devices shall be provided at all horizontal and vertical bends and fittings, in casings under roads and railroads and at other locations as indicated on the construction drawings. Thrust restraint devices for PVC pipe and fittings shall be either concrete thrust blocks or restraining glands as manufactured by Star Pipe Products, Stargrip 3000 and 3100, Allgrip 3600, or as manufactured by EBAA Iron Sales, Megaflange, 2000PV or other approved equal restraining gland products. Restrained joints, where used, shall be installed at bend and fitting locations and at pipe joint locations both upstream and downstream from bends or fittings at distances as required by these Standards.

G. All fittings for PVC pipe shall be ductile iron or gray iron with mechanical joints and shall conform to AWWA C110 or AWWA C153 and to the applicable sections of these Standards for ductile iron and gray iron fittings.

H. All pipe materials used in potable water systems shall comply with NSF Standard 61.

PART 3 EXECUTION

3.01 INSTALLATION

The Contractor shall install the plastic pipe in strict accordance with the manufacturer's technical data and printed instructions.

3.02 DETECTION

A. Direct buried pipe shall have 3" warning tape of the proper color placed directly above the pipe 12" below finished grade or 6" warning tape between 12" and 24" below grade.

B. PVC pipe shall have a solid, 10 gauge, high strength, copper clad steel wire with a polyethylene jacket of appropriate color installed along the pipe alignment as detailed in these standards. Tracer wire shall be manufactured by Copperhead Industries or Manatee County approved equal.~~PVC pipe shall have a No. 10 gauge solid, insulated wire of proper color installed along the pipe alignment as detailed in these Standards.~~

3.03 IDENTIFICATION

A. PVC pipe shall bear identification markings in accordance with AWWA C900, AWWA C905 or ASTM D2241.

B. PVC pipe shall be color coded blue for water, purple (Pantone purple 522C) for reclaimed water or green for pressure sewer using a solid pipe color pigment.

3.04 INSPECTION AND TESTING

All pipelines shall remain undisturbed for 24 hours to develop complete strength at all joints. All pipelines shall be subjected to a hydrostatic pressure and leak testing. Refer to Manatee County Public Works Utility Standards Part 1-Utility Standards Manual Section 1.8.7. Prior to testing, the pipe lines shall be supported in a manner approved by the County to prevent movement during tests.

END OF SECTION

SECTION 02623 POLYVINYL CHLORIDE (PVC) PIPE (GRAVITY SEWER)

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all labor, equipment, materials, pipe and incidentals and shall construct gravity sewers, complete, as shown on the drawings and as herein specified.

B. The work shall include furnishing, laying and testing gravity sewer pipe.

1.02 SUBMITTALS DURING CONSTRUCTION

A. The Contractor shall submit prior to construction, Shop Drawings, Working Drawings and Samples for approval to the County.

B. The Contractor shall submit to the County not less than fourteen (14) calendar days after the date of the Notice to Proceed, a list of materials to be furnished, the names of suppliers and an expected schedule of delivery of materials to the site.

C. The Contractor shall furnish in duplicate to the County sworn certificates that all tests and inspections required by the Specifications under which the pipe is manufactured have been satisfied.

D. The pipe manufacturer shall inspect all pipe joints for out-of-roundness and pipe ends for squareness. The Contractor shall furnish to the County, a manufacturer's Notarized Affidavit stating all pipe meets the requirements of ASTM, ASCE, ANSI, the Contract Documents, as well as all applicable standards regarding the joint design with respect to square ends and out-of-round joint surfaces.

1.03 INSPECTION AND TESTS

A. All pipe and accessories installed under this Contract shall be inspected and tested as required by the Standard Specifications to which the material is manufactured. The pipe shall be tested at the place of manufacture or taken to an independent laboratory by the manufacturer.

B. Each length of pipe shall be subject to inspection and approval at the factory, point of delivery and site of work. Sample of pipe to be tested shall be selected at random by the County or the testing laboratory and shall be delivered by the Contractor to the testing laboratory approved by the County.

C. When the specimens tested conform to applicable standards, all pipe represented by such specimens shall be considered acceptable based on the test parameters measured. Copies of test reports shall be submitted to the County prior to the pipe installation. Acceptable pipe shall be stamped with an appropriate monogram under the supervision of the testing laboratory.

D. All pipe test specimens failing to meet the applicable standards shall be rejected. The Contractor may provide two additional test specimens from the same shipment or delivery for each failed specimen. The pipe shall be acceptable if both of these additional specimens meet the requirements of the applicable standards.

E. Pipe which has been deemed unacceptable by the County shall be removed from the work site by the Contractor and shall be replaced with acceptable pipe.

PART 2 MATERIALS

2.01 GENERAL

A. The sizes of gravity sewer pipe shall be shown on the Drawings.

B. Each length of pipe shall bear the name or trademark of the manufacturer, the location of the manufacturing plant and the class or strength classification of the pipe. The markings shall be plainly visible on the pipe barrel.

2.02 POLYVINYL CHLORIDE (PVC) GRAVITY SEWER PIPE

A. Polyvinyl chloride (PVC) gravity sewer pipe and fittings, 4-15 inches in diameter, shall be SDR 26, meeting the requirements of ASTM D 3034. Joining of pipe sections and fittings shall be by water-tight push-on joints using elastomeric gaskets in accordance with ASTM D 3212.

B. Polyvinyl chloride (PVC) pipe, 16-48 inches in diameter, for gravity sewers, shall be DR 25, with cast-iron (CI) outside diameter, meeting the requirements of AWWA C905.

C. All PVC sewer pipe bell ends shall be field inspected for out-of-roundness and spigot ends shall be field inspected for out-of-roundness and for squareness of the pipe end. Any materials not in conformance with the tolerances of ASTM D 3212 or AWWA C905 shall be removed from the work site.

D. All PVC sewer pipe sections shall also be field inspected for excessive cross-section deflection. Any pipe section visually found to have a pipe deflection, before installation, of 2 percent of the Base Inside Diameter or greater shall be removed from the work site. After installation and backfill, pipe deflection shall not be allowed to be 5 percent or greater of the Base Inside Diameter. Any length of pipe found installed having excessive deflection shall be dug up and either reinstalled or removed from the work site.

E. Six inch PVC fittings for sewer laterals shall also be SDR 26, molded in one piece, with elastomeric joints in accordance with ASTM D-3034. Fittings not currently available in molded form may be fabricated in accordance with ASTM D-3034 with manufacturer's standard pipe bells and gaskets.

2.03 JOINING PVC GRAVITY SEWER AND FITTING

A. The PVC joints shall be of the push-on type with a single rubber gasket conforming to ASTM F 477.

B. Wyes and riser fittings shall be gasketed connections. Rubber doughnuts are not to be used.

C. Joints between pipes of different materials shall be made using stainless steel shielded couplings (as provided by Fernco) or Protecto 401 mechanical joint connections. Metal piping shall not be threaded into plastic fittings, valves, or couplings, nor shall plastic piping be threaded into metal valves, fittings, or couplings.

2.04 IDENTIFICATION AND DETECTION

A. PVC gravity sewer pipe shall bear identification markings in accordance with ASTM D 3034 or AWWA C905.

B. PVC gravity sewer pipe shall be color-coded green using a solid pipe color pigment.

PART 3 EXECUTION

3.01 PIPE DISTRIBUTION

The Contractor shall not distribute material on the job faster than it can be used to good advantage. He shall unload pipe, which cannot be physically lifted by workers from the trucks, by a forklift or other approved means. He shall not drop pipe of any size from the bed of the truck to the ground. He shall not distribute more than one weeks supply of material in advance of laying, unless otherwise approved by the County.

3.02 PIPE PREPARATION AND HANDLING

A. The Contractor shall inspect all pipe and fittings prior to lowering them into trench. Cracked, broken, or otherwise defective materials are not acceptable and shall not be used. The Contractor shall clean the ends of the pipe thoroughly. He shall remove foreign matter and dirt from inside of pipe and keep the pipe clean during and after laying.

B. The Contractor shall use proper implements, tools and facilities for the safe and proper protection of the work. He shall lower the pipe into the trench in a manner to avoid any physical damage to the pipe, remove all damaged pipe from the job site and under no circumstances shall the pipe be dropped or dumped into trenches.

3.03 LINE AND GRADE

A. The Contractor shall not deviate more than 1/2-inch for line and 1/4-inch for grade from the line design and design grade established by the County provided that such variation does not result in a level or a reverse sloping invert. He shall measure the grade at the pipe invert and not at the top of the pipe. The Contractor shall furnish, set and control the line and grade by laser beam method. Other methods of controlling line and grade may be submitted to the County for approval if using the laser beam method proves to be impractical because of other conditions.

B. The Contractor shall use the laser beam method of maintaining line and grade. The Contractor shall submit evidence to the County that a qualified operator shall handle the equipment during the course of construction. A "Caution-Laser Light" placard shall be displayed in a conspicuous place. When "in the pipe" method is used, grade boards shall be installed for the first 50 feet of pipe. The Contractor shall check the line and grade at any additional points at which offset stakes have been placed and when requested by the County. A fan shall be provided to circulate the air if bending of the beam due to air temperature variations becomes apparent with "in the pipe" units. However excessive air velocity shall not be permitted to cause pulsating or vibrating of the beam. If, in the opinion of the County, the beam cannot be accurately controlled, this method of setting line and grade shall be discontinued. When the above ground method is used, the set-up shall be checked with the three grade boards including one set at the upstream manhole. If the laser has a gradient indicator, two boards may be used to check the set-up. The grade board at the up-stream manhole shall be retained to check into as pipe laying progresses.

3.04 PREPARATION OF TRENCH

A. The Contractor shall provide pipe bedding material under all the pipe for the full trench width. The minimum depth of bedding material below the pipe barrel shall be as follows

Minimum Depth of

Pipe Size	Bedding Under Pipe Barrel
15" & Smaller	4 inches
18" to 36"	6 inches
42" & Large	9 inches

B. The depth of pipe bedding material under the pipe bell shall not be less than three inches under normal trench conditions.

C. The Contractor shall hand-grade bedding to proper grade ahead of the pipe laying operation. The bedding shall provide a firm, unyielding support along the entire pipe length.

D. Should the Contractor excavate the trench below the required depth for pipe bedding material placement without direction from the County, the Contractor shall fill the excess depth with pipe bedding material as specified herein to the proper subgrade.

E. The Contractor shall excavate bell holes at each joint to permit proper assembly and inspection of the entire joint.

3.05 DEWATERING

The Contractor shall prevent water from entering the trench during excavation and pipe laying operations to properly grade the bottom of the trench and allow for proper compaction of the backfill. Pipe shall not be laid in water.

3.06 LAYING AND JOINTING PIPE AND FITTINGS

A. The Contractor shall lay pipe upgrade with spigot ends pointing in direction of flow. After a section of pipe has been lowered into the prepared trench, he shall clean the end of the pipe to be joined, the inside of the joint and, if applicable, the rubber ring immediately prior to joining the pipe. The Contractor shall assemble the joint in accordance with the recommendations of the manufacturer of the type of joint used. He shall provide all special tools and appliances required for the jointing assembly.

B. The Contractor shall lay all pipe uniformly to line and grade so that the finished sewer shall present a uniform bore. Variations from line and grade in excess of the tolerances specified under LINE AND GRADE are not acceptable and the work shall be rejected.

C. The Contractor shall check the pipe for alignment and grade after the joint has been made. The pipe bedding shall form a continuous and uniform bearing and support for the pipe barrel between joints. Sufficient pressure shall be applied to the joint to assure that the joint is "home" as defined in the standard installation instructions provided by the pipe manufacturer. The Contractor shall place sufficient pipe cover material to secure the pipe from movement prior to installing the next joint to assure proper pipe alignment and joint makeup.

D. Pipe 21" and smaller intended to be in straight alignment shall be laid so that the inside joint space does not exceed 3/8" in width. If interior joints on 24" and larger pipe laid either in straight alignment or on a curve are greater than 3/8", the Contractor shall thoroughly clean the joint surfaces and fill and seal the entire joint with premixed mortar conforming to ASTM C-387 only after the trench has been backfilled, unless otherwise approved by the County. Trowel smooth on the inside surface. Water shall not be allowed to rise in or around, or pass over any joint before it has substantially set.

E. When the Contractor lays pipe within a movable trench shield, he shall take all necessary precautions to prevent pipe joints from pulling apart when moving the shield ahead.

F. The Contractor shall prevent excavated or other foreign material from getting into the pipe during the laying operation. He shall close and lock the open end of the last laid section of pipe to prevent entry of foreign material or creep of the gasketed joints when laying operations cease, at the close of the day's work, or whenever the workers are absent from the job.

G. The Contractor shall plug or close off the pipes which are stubbed off with temporary plugs.

H. The Contractor shall take all necessary precautions to prevent the "uplift" or floating of the line prior to the completion of the backfilling operation.

I. The Contractor shall make connections of non-reinforced pipe to manholes or concrete structures, so that a standard pipe joint is located at a minimum of 18" outside the edge of structure.

J. When field cutting and/or machining the pipe is necessary, the Contractor shall use only tools and methods recommended by the pipe manufacturer and approved by the County.

K. Service lateral shall be constructed by the Contractor as shown on the standard sewer details and located approximately as shown on the Contract Drawings.

3.07 LAYING PLASTIC PIPE

A. Polyvinyl chloride (PVC) pipe shall be installed by the Contractor in accordance with the instructions of the manufacturer, as shown on the Drawings and as called out in the Contract Documents.

B. The Contractor shall lay the pipe, bedding and backfill to lines and grade shown on the Drawings and called out in the Contract Documents. Blocking under the pipe will not be permitted.

C. The Contractor shall install a green metallic tape as shown in these Standards below finish grade along the entire pipeline PVC sewer main pipe route.

D. The Contractor shall use care in the handling, storage and installation of pipe. Storage of pipe on the job site shall be done in accordance with the pipe manufacturer's recommendation.

3.08 BACKFILL IN THE PIPE ZONE

A. The pipe zone shall be considered to include the full width of the excavated trench from the bottom of the trench to a point above the top outside surface of the barrel of the pipe.

B. The Contractor shall pay particular attention to the area of the pipe zone from the flow line to the springline of the pipe to insure that firm support is obtained to prevent any lateral movement of the pipe during the final backfilling of the pipe zone.

C. The Contractor shall take care to insure that the pipe does not rest directly on the bell or pipe joint, but is uniformly supported on the barrel throughout its entire length.

D. After the pipe is laid by the Contractor to line and grade, he shall place and carefully compact pipe bedding material for the full width of the trench to the springline of the pipe. He shall place the material around the pipe in 6-inch layers and thoroughly hand tamp with approved tamping sticks supplemented by "walking in" and slicing with a shovel to assure that all voids are filled.

E. The Contractor shall backfill and carefully compact the area above the pipe springline with pipe cover material to a point 12" above the top outside surface of the pipe barrel. Pipe bedding material may, at the Contractor's option, be substituted for pipe cover material.

3.09 EXCESS TRENCH WIDTH

A. Normal trench widths shall be as shown on the Drawings. If the normal trench width below the top of the pipe is exceeded for any reason, the Contractor shall furnish an adequate support for the pipe. The County may determine that the pipe being used is strong enough for the actual trench width or the Contractor may furnish a stronger pipe or a concrete cradle for approval.

B. Concrete thickness under the pipe shall be one-third of the nominal diameter of the pipe, but not less than four inches. Concrete block or brick may be used for adjusting and maintaining proper grade and elevation of pipe. After the pipe is laid to line and grade, the Contractor shall place 3,000 psi concrete under the pipe for the full width of the trench to form a cradle of the required length and thickness with the concrete brought up to a level equal to 1/4 of the inside pipe diameter below the springline of the pipe. Start and terminate the concrete cradle at the face of a pipe bell or collar. Do not encase pipe joints at the ends of the concrete cradle.

C. After the concrete has taken initial set, the Contractor shall place cover material over the concrete cradle and up to a level 12" above the pipe barrel and for the full width of the trench. Cover material shall be placed by hand or by equally careful means.

3.10 CONNECTING DISSIMILAR PIPE MATERIALS

The Contractor shall use the following method to connect dissimilar pipe materials. Use concrete closure collars only when approved by the County and then only to make connections between dissimilar pipe when standard rubber gasketed joints or shielded couplings are impracticable. Before the closure collars are poured, wash the pipe to remove all loose material and soil from the surface on which the concrete will be placed. Wet nonmetallic pipe thoroughly prior to pouring the collars. Wrap and securely fasten a light gauge of sheet metal or building-felt around the pipe to insure that no concrete shall enter the line. Place reinforcement as shown on the plans. Make entire collar in one pour using 3,000 psi concrete and extend a minimum 12" on each side of the joint. The minimum thickness around the outside diameter of the pipe shall be 6". No collar shall be poured in water. After the collars are poured and have taken their initial set, cure by covering with well-moistened earth.

3.11 PIPE BULKHEADS

A. Connections for future sewers shall be bulkheaded by the Contractor in the following manner:

1. All wyes and bell-and-spigot pipe sewers 18" in diameter or smaller shall be bulkheaded with caps or disc stoppers with factory-fabricated resilient joints. The disk or cap shall be banded or otherwise secured to withstand all test pressures without leakage.
2. Connections 21" and 24" in diameter shall be bulkheaded with a four-inch brick wall, using clay brick or concrete brick. The wall shall be capable of withstanding all test pressures without leakage.
3. Connections 27" in diameter and larger shall be bulkheaded with an eight-inch wall, using clay brick or concrete brick. The wall shall be capable of withstanding all test pressures without leakage.

3.12 AIR TEST FOR GRAVITY SEWERS - GENERAL

A. Gravity sewers shall be required to pass the low pressure air test. All pipelines shall remain undisturbed for 24 hours to develop complete strength at all joints. Refer to Manatee County Public Works Utility Standards Part 1-Utility Standards Manual Section 1.8.10.

B. Air loss rates may be measured by the County. These tests shall be performed by the Contractor under the observation of the County Inspector.

C. The groundwater height above the installed pipe shall be determined by attaching a transparent plastic tube to a pipe nipple in the manhole and using the plastic tube as a manometer. A test hole may be dug directly above the sewer main for visual inspection.

D. The ends of branches, laterals, tees, wyes and stubs included in a test section shall be plugged to prevent air leakage. All plugs shall be secured to prevent blowout due to internal pressure. A test section is defined as the length of sewer between manholes.

E. The Contractor shall repair all visible leaks in manholes and pipe, even if the leakage test requirements are met.

3.13 TELEVISION INSPECTION OF GRAVITY SEWERS

A. TV inspection of the entire length of the inside of new gravity sewer mains shall be conducted by the Contractor. The County Inspector shall have been notified and shall be present during the TV inspection.

B. The sewer pipelines shall be thoroughly cleaned of all dirt, debris or obstructions before the TV inspection. Water shall be added to the upstream manhole until it is seen flowing from the most downstream point of the system to be inspected.

C. The TV camera shall be a self-propelled, 360 degree pan-head, high resolution, color type and shall have dual DVD recording capability. The camera shall be equipped with a depth gauge calibrated to ¼-inch increments to accurately record the depth of the water in the pipeline. A calibration report shall be submitted with each digital video disk (DVD), which shall include a drawing of the depth gauge, indicating the marks on the gauge, and what depth each mark represents.

D. The County Inspector shall be present and will observe the TV monitor along with the camera operator as the camera progresses through the pipe. All pipelines will be inspected with the camera progressing in an upstream direction when possible. The camera operator shall record the manhole numbers and the distance the camera has progressed from the downstream manhole as the inspection proceeds. The operator shall stop the progress of the camera and record the distance at all locations along the pipeline where unusual or defective features are encountered. The operator shall record the distance and depth of the water in the pipe at all locations where the depth is greater than or equal to 75% of the maximum depth as listed in the table below. The camera operator shall make records where cracked, dented or deformed pipe is found, or at joints that are not properly installed, or where infiltration is observed, or at any other abnormality or where any other defective feature is encountered.

E. Pipe grade between manholes shall not deviate by more than the maximum depth as list below from the design grade line, as measured with the television (TV) camera's depth gauge during the TV inspection, provided that such deviation does not result in a level or a reverse slope. Joint deflection and longitudinal pipe deflection between manholes that exceeds the maximum depth or more than two deflections that exceed 75% of the maximum depth, as measured with the television camera's depth gauge during the TV inspection, shall not be accepted.

	Water Holding Depth (inches)	
Pipe Sizes		Maximum
8 inch to 15 inch		1.00
18 inch to 21 inch		2.00
24 inch and greater		2.50

F. At the end of the inspections, or at the end of the day, one original digital video disk (DVD) of the TV record shall be submitted to the County Inspector along with the written inspection report and depth gauge calibration for evaluation. The County's representative shall be the sole judge of whether any information imparted by the TV test DVD will cause the County to accept or reject the pipe test section.

3.14 PIPE RING DEFLECTION TESTING OF GRAVITY SEWERS (MANDREL)

A. The Contractor shall perform a pipe ring deflection test on all new gravity sanitary sewer mains. The rigid ball or mandrel used for the ring deflection test shall have a diameter not less than 95 percent of the base inside diameter or average inside diameter of the pipe depending on which is specified in the ASTM C 3034, to which the pipe is manufactured. The test shall be performed without mechanical pulling devices.

B. The allowable ring deflection is 5 percent of the inside pipe diameter. Pipes that have a ring deflection that exceeds this amount shall not be accepted.

3.15 FINAL SEWER CLEANING

A. Prior to final acceptance and final manhole-to-manhole inspection of the sewer system by the County, the Contractor shall flush and clean all parts of the system, remove all accumulated construction debris, rocks, gravel, sand, silt and other foreign material from

the sewer system at or near the closest downstream manhole.

B. During the final manhole-to-manhole inspection of the sewer system, the County may require the Contractor to reflush and clean any section or portion of the line if any foreign matter is still present in the system.

END OF SECTION

SECTION 02640 VALVES AND APPURTENANCES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials, equipment and incidentals required and install complete and ready for operation all valves and appurtenances as shown on the Drawings and as specified herein.

B. All of the types of valves and appurtenances shall be products of well-established reputable firms who are fully experienced and qualified in the manufacture of the particular equipment to be furnished. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these standards as applicable. Valves used in waterworks applications shall comply with Section 8 of NSF Standard 61 for mechanical devices.

C. All of the equipment and materials specified herein are intended to be standard for use in controlling the flow of potable water, reclaimed water, wastewater, etc., depending on the applications.

D. All valves and appurtenances shall be of the size shown on the drawings and, to the extent possible, all equipment of the same type on the project shall be from a single manufacturer.

E. All valves and appurtenances shall have the name of the manufacturer, year of the valve and the working pressure for which they are designed cast in raised letters upon some visible part of the body.

F. Special tools, if required for the normal operation or maintenance, shall be supplied with the equipment.

G. All hand actuated buried valves shall have three-piece adjustable valve boxes and 2-inch square AWWA operating nuts. Provide stainless steel extension stems and alignment rings where needed to bring the operating nut to within 4 feet below the box lid.

H. Water and reclaimed water system isolation valves shall be gate valves for sizes 2-inch through 12-inch and shall be butterfly valves for sizes 16-inch and larger.

I. Isolation valves for sewer force main pipelines shall be gate valves, unless otherwise noted on the plans. Tapping valves shall be used for tapping force mains. Plug valves shall be full port, have a 100% circular cross section, and must have prior written authorization from the County for use.

J. Valves shall open when turning the operating nut or wheel counterclockwise and shall close when turning clockwise.

K. All bonnet bolts, gland bolts, flange connection bolts, nuts, washers, and other trim hardware exposed to the outside environment shall be stainless steel. Thrust collar tie-rod bolts and nuts shall be stainless steel. All MJ-type underground bolts, nuts, and washers shall be stainless steel.

L. All valves shall have a factory applied, holiday free, fusion bonded epoxy coating on the interior and exterior unless otherwise noted in the plans or the following specification. All

other painted items exposed to sunlight, including field painted box lids, etc., shall be painted the appropriate color with an epoxy type paint.

M. No valves with a break-way stem shall be allowed.

N. The equipment shall include, but not be limited to, the following:

1. Gate valves (Sec. 2.01)
2. Combination Pressure Reducing and Pressure Sustaining with Check Valves Option (Sec. 2.02)
3. Ball Valves (Sec. 2.03)
4. Butterfly Valves (Sec. 2.04)
5. Plug Valves (Sec. 2.05)
6. Valve Actuators (Sec. 2.06)
7. Air Release Valves (Sec. 2.07)
8. Valves Boxes (Sec. 2.08)
9. Corporation Stops and Saddles (Sec. 2.09)
10. Flange Adapters and Plain End Couplings (Sec. 2.10)
11. Hose Bibs (Sec. 2.11)
12. Swing Check Valves (Sec. 2.12)
13. Hydrants (Sec. 2.13)
14. Restrained Joints (Sec. 2.14)
15. Tapping Sleeves and Tapping Valves (Sec. 2.15)
16. Tracer Wire Boxes (Sec. 2.16)
17. Insertion Valves (Sec. 2.17)

1.02 SUBMITTALS

A. Submit to the County within 30 days after execution of the contract a list of materials to be furnished, the names of the suppliers and the date of delivery of materials to the site.

B. Complete shop drawings of all valves and appurtenances shall be submitted to the County for approval in accordance with the Specifications.

1.03 TOOLS

Special tools, if required for normal operation and maintenance shall be supplied with the equipment.

PART 2 PRODUCTS

2.01 GATE VALVES

A. Where indicated on the drawings or necessary due to locations, size, or inaccessibility, chain wheel operators shall be furnished with the valves. Such operators shall be designed with adequate strength for the valves with which they are supplied and provide for easy operation of the valve. Chains for valve operators shall be galvanized.

B. Gate valves installed underground shall be provided with a box cast in a concrete pad and a box cover. Stainless steel or equivalent valve extension stems shall be provided to place the valve operating nut no more than 4 feet deep. One valve wrench, 6 feet in length, shall be provided for every 15 valves installed.

C. Gate valves 2 inches to 14 inches in diameter shall be resilient seated, manufactured to meet or exceed the requirements of AWWA C509 or AWWA C515 and shall be UL listed and FM approved where applicable. Valves shall have an unobstructed waterway equal to or greater than the full nominal diameter of the valve.

D. The valves shall have a non-rising stainless steel stem to eliminate lead content. All bolts, nuts and washers shall be stainless steel to eliminate exterior corrosion and maintain fastener strength. Manufacturer shall use Never-Seez or equivalent during assembly of bolt and nut sets to prevent galling of similar metals. Stem seals shall be provided and shall be of the O-ring type, two above and one below the thrust collar. Valves that are located above grade and located in valve vaults shall be OS&Y with flanged joints.

E. The wedge shall be ductile iron fully encapsulated with an EPDM rubber. The Elastomer type shall be permanently indicated on the disc or body of the valve. The resilient sealing mechanism shall provide zero leakage at the water working pressure when installed with the line flow in either direction.

F. The valve body, bonnet, and bonnet cover shall meet or exceed all the requirements of AWWA C515.

G. Valves meeting AWWA C515 requirements shall be rated for an operating pressure of 250 psi and shall be tested in accordance with AWWA C515.

H. The valves are to have 2-inch cast or ductile iron AWWA operating nuts and shall open left or counterclockwise.

I. The valves shall be covered by a Manufacturer's 10 year warranty on manufacturer's defects and reasonable labor costs for replacement. Warranty shall become effective from the date of purchase by the end user and delivered within 30 days from the receipt of the purchase order. For publicly owned and maintained utilities, the end user is Manatee County Government.

J. Gate valves shall be assembled and tested in a certified ISO 9001:2000 manufacturing facility within the United States and provide their certification of meeting internationally recognized quality control procedures.

2.02 COMBINATION PRESSURE REDUCING & PRESSURE SUSTAINING WITH CHECK VALVE OPTION

A. Pressure sustaining and check valve shall be pilot operated diaphragm actuated valve with cast iron body, bronze trim, and 125-pound flanged ends. The valve shall be hydraulically operated, diaphragm type globe valve. The main valve shall have a single removable seat and a resilient disc, of rectangular cross section, surrounded on three and a half sides. No external packing glands are permitted and there shall be no pistons operating the main valve or any controls. The valve shall be equipped with isolation valves to service the pilot system while permitting flow if necessary. Main valve and all pilot controls shall be manufactured in the United States of America. Valve shall be single chamber type, with stainless steel stem.

B. Valve shall automatically reduce pressure for the downstream distribution network and sustain a minimum pressure in the high pressure main regardless of distribution demand, and as an option, shall also close when a pressure reversal occurs for check valve operations. The pilot system shall consist of two direct acting, adjustable, spring loaded diaphragm valves.

C. Valve shall be cast iron or ductile iron with main valve trim of brass and bronze. The pilot control valves shall be cast brass with 303 stainless steel trim. Valve shall be similar in all respects to Cla-Val Company, Model 92-01 or a similar control valve such as Bermad Model 723, GA Industries Model 4700 or an approved equal.

2.03 BALL VALVES

A. Ball valves for water and reclaimed water, in sizes 3/4-inch through 2-inch, shall be brass body, stem and ball per ASTM B 62, alloy 85-5-5-5, full port, full flow, 1/4-turn check, ball curb valves, rated for 300 psi, Mueller 300 (as specified in the table below), Ford B-Series, or approved equal, with compression, pack joint, flare, threaded or flanged ends as required. Ball valves for wastewater, 2-inch through 3-inch, shall be 316 stainless steel body, cap, stem and ball per ASTM A351, full port, full flow, 1/4-turn check, ball valves, steam rated for 150 psi, pressure rating 1,000 psi CWT, Apollo 76F or approved equal, with threaded or flanged ends as required.

Curb Stops for Water and Reclaimed Water

Pipe Material	Type of Connection	Model
HDPE	Compression x FIP	B-25170 *
HDPE	Pack Joint x FIP	P-25170 *
Copper	Compression x FIP	B-25170
Copper	Flare x FIP	B-25166
Stainless Steel	FIP x FIP Thread	B-20200
* Insert required, part number per manufacturer product information		

B. All valves shall be mounted in such a position that valve position indicators are plainly visible. Above grade ball valves shall have a vinyl coated lever handle. Lever handle, handle nut, and lever packing gland shall be 304 or 316 stainless steel.

C. Potable plastic service pipe material and compression and pack joint connectors shall not be used in soil that is contaminated with low molecular-weight petroleum products, aromatic hydrocarbons, chlorinated hydrocarbons or organic solvents. Appropriate service tubing shall apply.

2.04 BUTTERFLY VALVES

A. Butterfly valves shall conform to AWWA C504, Class 250 B, Mueller Lineseal XPII, DeZurik AWWA, Pratt HP-250II, or an approved equal.

B. Valve seats shall be an EPDM elastomer. Valve seats 24 inches and larger shall be field adjustable and replaceable without dismounting operator dise or shaft and without removing the valve from the line. Valves 20 inches and smaller shall have bonded or mechanically restrained seats as outlined in AWWA C504.

C. All valves shall be subject to hydrostatic and leakage tests at the point of manufacture. The hydrostatic test for Class 250 valves shall be performed with an internal hydrostatic pressure equal to 500 psi applied to the inside of the valve body of each valve. During the hydrostatic test, there shall be no leakage through the metal, the end joints or the valve shaft seal. The leakage test for the Class 250 valves shall be performed at a differential pressure of 250 psi

and against both sides of the valve. No adjustment of the valve disc shall be necessary after pressure test for normal operation of valve. All valves shall be leaktight in both directions.

D. Butterfly valve actuators shall conform to AWWA C504. Gearing for the actuators shall be totally enclosed in a gear case. Actuators shall be capable of seating and unseating the disc against the full design pressure and shall transmit a minimum torque to the valve. Actuators shall be rigidly attached to the valve body.

E. The valve shaft shall be constructed of 18-8, ASTM A-276, Type 304 stainless steel and designed for both torsional and shearing stresses when the valve is operated under its greatest dynamic or seating torque. Shaft shall be of either a one piece unit extending full size through the valve disc and valve bearing or it may be of a stub shaft design. Shaft bearings shall be teflon or nylon, self-lubricated type.

F. Gearing for the operators shall be totally enclosed in a gear case in accordance with paragraph 3.8.3 of the above mentioned AWWA Standard Specification.

G. Operators shall be capable of seating and unseating the disc against the full design pressure of velocity, as specified for each class, into a dry system downstream and shall transmit a minimum torque to the valve. Operators shall be rigidly attached to the valve body.

H. The manufacturer shall certify that the required tests on the various materials and on the completed valves have been satisfactory and that the valves conform with all requirements of this Specification and the AWWA standard.

I. Where indicated on the Drawings, extension stems, floor stands, couplings, stem guides, and floor boxes as required shall be furnished and installed.

2.05 PLUG VALVES

A. Plug valves shall be eccentric, non-lubricating type with integral plug and shafts and shall be furnished with end connections and with actuating mechanisms as called for on the construction plans or as otherwise required. Valves shall seal bubble-tight or water drop-tight in both directions when tested according to the Leakage Test method of AWWA C504 with a hydrostatic pressure of 150 psi.

B. Plug valves shall also be subjected to the internal, full body Hydrostatic Test of AWWA C504 at a pressure two times the rated pressure or a minimum pressure of 300 psi, whichever is greater. During the test, there shall be no leakage through the metal, or through the end joints or shaft seal, nor shall any part of the valve be deformed. Plug valves shall be Kennedy or Dezurik.

C. Flanged valve ends shall be faced and drilled according to ANSI B 16.1, Class 125. Mechanical joint valve ends shall conform to AWWA C111. Threaded ends shall conform to the NPT requirements of ANSI B1.20.1.

D. The plug valve body, bonnet and gland shall be ductile iron per ASTM A 126, Class B. The integral plug and shafts shall be cast iron ASTM A 126, Class B, or 316 stainless steel. The entire plug, except for the shafts, shall be covered with nitrile (Buna N) rubber. The rubber compound shall have been vulcanized to the metal plug and shall have a peel strength of not less than 75 pounds per inch when tested according to ASTM D 429, method B. The

valve seat shall be at least 90 percent pure nickel, welded-in overlay into the cast iron body. The top and bottom bearings shall be 316 stainless steel.

E. Plug valves shall have a full port area of 100 percent of the nominal pipe size area.

F. Valves shall have worm gear type actuators with 2-inch square operating nuts.

G. Plug valves shall be installed side-ways with plug shaft horizontal so that the plug rotates upward when it opens, with the flow entering the seat end of the valve.

H. Plug valves shall be coated inside with Protecto 401 or amine-cured novolac ceramic epoxy or another two-part epoxy suitable for sanitary sewer service which has been approved by Manatee County.

2.06 VALVE ACTUATORS

A. Butterfly valve and plug valve actuators.

Butterfly valve and plug valve actuators shall conform to the requirements for actuators presented in AWWA C 504 and shall be either manual or motor operated. Actuators shall be capable of seating and unseating the disc against the full design pressure and velocity, as specified for each class, into a dry system downstream, and shall transmit a minimum torque to the valve. Actuators shall be rigidly attached to the valve body.

B. Manual Actuators.

Manual actuators shall have permanently lubricated, totally enclosed gearing with handwheel and gear ratio sized on the basis of actual line pressure and velocities. Actuators shall be equipped with handwheel, position indicator, and mechanical stop-limiting locking devices to prevent over travel of the disc in the open and closed positions. They shall turn counter-clockwise to open valves. Manual actuators shall be of the traveling nut, self-locking type or of the worm gear type and shall be designed to hold the valve in any intermediate position between fully open and fully closed without creeping or fluttering. Valves located above grade shall have handwheel and position indicator, and valves located below grade shall be equipped with a 2-inch square AWWA operating nut located at ground level and cast iron extension type valve box.

C. Motor Actuators (Modulating)

(1) The motor actuated valve controller shall include the motor, actuator unit gearing, limit switch gearing, limit switches, position transmitter which shall transmit a 4-20 mA DC signal, control power transformer, electronic controller which will position the valve based on a remote 4-20 milliamp signal, torque switches, bored and key-wayed drive sleeve for non-rising stem valves, declutch lever and auxiliary handwheel as a self-contained unit.

(2) The motor shall be specifically designed for valve actuator service using 480 volt, 60 Hertz, three phase power as shown, on the electrical drawings. The motor shall be sized to provide an output torque and shall be the totally enclosed, non-ventilated type. The power gearing shall consist of helical gears fabricated from heat treated alloy steel forming the first stage of reduction. The second reduction stage shall be a single stage worm gear. The worm shall be of alloy steel with carburized threads hardened and ground for high efficiency. The worm gear shall be of high tensile strength bronze with

hobbed teeth. All power gearing shall be grease lubricated. Ball or roller bearings shall be used throughout. Preference will be given to units having a minimum number of gears and moving parts. Spur gear reduction shall be provided as required.

(3) Limit switches and gearing shall be an integral part of the valve control. The limit switch gearing shall be made of bronze and shall be grease lubricated, intermittent type and totally enclosed to prevent dirt and foreign matter from entering the gear train. Limit switches shall be of the adjustable type capable of being adjusted to trip at any point between fully opened valve and fully closed valve.

(4) The speed of the actuator shall be the responsibility of the system supplier with regard to hydraulic requirements and response compatibility with other components within the control loop. Each valve controller shall be provided with a minimum of two rotor type gear limit switches, one for opening and one for closing. The rotor type gear limit switch shall have two normally open and two normally closed contacts per rotor. Gear limit switches must be geared to the driving mechanism and in step at all times whether in motor or manual operation. Provision shall be made for two additional rotors as described above, each to have two normally open and two normally closed contacts. Each valve controller shall be equipped with a double torque switch. The torque switch shall be adjustable and will be responsive to load encountered in either direction of travel. It shall operate during the complete cycle without auxiliary relays or devices to protect the valve, should excessive load be met by obstructions in either direction of travel. The torque switch shall be provided with double-pole contacts.

(5) A permanently mounted handwheel shall be provided for manual operation. The handwheel shall not rotate during electric operations, but must be responsive to manual operation at all times except when being electrically operated. The motor shall not rotate during hand operation nor shall a fused motor prevent manual operation. When in manual operating position, the unit will remain in this position until motor is energized at which time the valve operator will automatically return to electric operation and shall remain in motor position until handwheel operation is desired. This movement from motor operation to handwheel operation shall be accomplished by a positive declutching lever which will disengage the motor and motor gearing mechanically, but not electrically. Hand operation must be reasonably fast. It shall be impossible to place the unit in manual operation when the motor is running. The gear limit switches and torque switches shall be housed in a single easily accessible compartment integral with the power compartment of the valve control. All wiring shall be accessible through this compartment. Stepping motor drives will not be acceptable.

(6) The motor with its control module must be capable of continuously modulating over its entire range without interruption by heat protection devices. The system, including the operator and control module must be able to function, without override protection of any kind, down to zero dead zone.

(7) All units shall have strip heaters in both the motor and limit switch compartments.

(8) The actuator shall be equipped with open-stop-close push buttons, an auto-manual selector switch, and indicating lights, all mounted on the actuator or on a separate locally mounted power control station.

(9) The electronics for the electric operator shall be protected against temporary submergence.

(10) Actuators shall be Limitorque L120 with Modutronic Control System containing a position transmitter with a 4-20MA output signal or equal.

D. Motor Actuators (Open-Close)

(1) The electronic motor-driven valve actuator shall include the motor, actuator gearing, limit switch gearing, limit switches, torque switches, fully machined drive sleeve, declutch lever, and auxiliary handwheel as a self-contained unit.

(2) The motor shall be specifically designed for valve actuator service and shall be of high torque totally enclosed, nonventilated construction, with motor leads brought into the limit switch compartment without having external piping or conduit box.

(3) The motor shall be of sufficient size to open or close the valve against maximum differential pressure when voltage to motor terminals is 10% above or below nominal voltage.

(4) The motor shall be prelubricated and all bearings shall be of the anti-friction type.

(5) The power gearing shall consist of helical gears fabricated from heat treated steel and worm gearing. The worm shall be carburized and hardened alloy steel with the threads ground after heat treating. The worm gear shall be of alloy bronze accurately cut with a hobbing machine. All power gearing shall be grease lubricated. Ball or roller bearings shall be used throughout.

(6) Limit switches and gearing shall be an integral part of the valve actuator. The switches shall be of the adjustable rotor type capable of being adjusted to trip at any point between fully opened valve and fully closed valve. Each valve controller shall be provided with a minimum of two rotor type gear limit switches, one for opening and one for closing (influent valves require additional contacts to allow stopping at an intermediate position). The rotor type gear limit switch shall have two normally open and two normally closed contacts per rotor. Additional switches shall be provided if shown on the control and/or instrumentation diagrams. Limit switches shall be geared to the driving mechanism and in step at all times whether in motor or manual operation. Each valve actuator shall be equipped with a double torque switch. The torque switch shall be adjustable and will be responsive to load encountered in either direction of travel. It shall operate during the complete cycle without auxiliary relays or devices to protect the valve should excessive load be met by obstructions in either direction of travel. Travel and thrusts shall be independent of wear in valve disc or seat rings.

(7) A permanently mounted handwheel shall be provided for manual operation. The handwheel shall not rotate during electric operation except when being electrically operated. The motor shall not rotate during hand operation, nor shall a fused motor prevent manual operation. When in manual operating position, the unit will remain in this position until motor is energized at which time the valve actuator will automatically return to electric operation and shall remain in motor position until handwheel operation is desired. Movement from motor operation to handwheel operation shall be accomplished by a positive declutching lever which will disengage the motor and motor gearing mechanically, but not electrically. Hand operation must be reasonably fast. It shall be impossible to place the unit in manual operation when the motor is running.

(8) Valve actuators shall be equipped with an integral reversing controller and three phase overload relays, Open-Stop-Close push buttons, local-remote-manual selector switch, control circuit transformer, three-phase thermal overload relays and two pilot lights in a NEMA 4X enclosure. In addition to the above, a close coupled air circuit breaker or disconnect switch shall be mounted and wired to the valve input power terminals for the purpose of disconnecting all underground phase conductors.

(9) The valve actuator shall be capable of being controlled locally or remotely via a selector switch integral with the actuator. In addition, an auxiliary dry contact shall be provided for remote position feedback.

(10) Valve A.C. motors shall be designed for operation on a 480 volt, 3-phase service. Valve control circuit shall operate from a fuse protected 120 volt power supply.

(11) Motor operators shall be as manufactured by Limitorque Corporation, Type L120 or approved equal.

2.07 AIR RELEASE VALVES

A. Air release valves shall be automatic float operated, GA Industries fig-929 for sewer applications, Fig-920 for water and reclaimed water application, or an approved equal, with inlet size and working pressure ratings as required and NPT connections.

B. Valve bodies shall be ductile iron per ASTM A 126, Class B. The orifice, float and linkage shall be stainless steel. The seat shall be (Buna N) nitrile elastomer.

2.08 VALVE BOXES

A. Buried valves shall have adjustable cast iron or HDPE valve boxes. Lids shall be cast iron drop type, and shall have “WATER”, “SEWER”, or “RECLAIM”, as applicable, cast into the top. Lids will be painted “safety” blue for potable, purple for reclaimed, and green for sanitary sewer.

B. Cast iron boxes shall be two-piece, or three-piece, as required, screw type, Tyler Pipe, 6850 Series, Box 461-S through 668-S, with extensions, as required to make the desired box length, or an approved equal. Bottom barrel shall be 5-1/4 inches inside diameter, with a flanged bottom with sufficient bearing area to prevent settling.

C. HDPE boxes shall be two-piece, adjustable, 1/4-inch thick minimum heavy wall, high density polyethylene, with cast iron top and stainless steel adjustable stem, Trench Adapter, as manufactured by American Flow Control, or an approved equal. Bottom barrel shall have flanged bottom to prevent settling. All bolts, screws and pins shall be stainless steel.

D. Reclaimed Valve Boxes shall be square 9-inch x 9-inch load bearing marked “Reclaimed Water” and painted Pantone 522C purple.

E. All valves shall either have operating nuts within 4 feet below the top of the lid or shall have extension stems with centering guides to provide an extended operating nut within 4 feet below the lid. Extension stems shall be fixed to the valve operating nut with a stainless steel fastener.

F. All potable water, sewer, and reclaimed water grade-adjustment risers shall be cast iron material just like the valve box. No plastic or steel risers shall be allowed.

G. A centering device BoxLok or equal shall be installed in the valve box.

H. Stand pipe shall match color code of the system being installed, (blue for potable, Pantone purple 522 C for reclaimed, and green for sanitary sewer).

2.09 CORPORATION STOPS AND SADDLES

A. Corporation stops for connections to ductile iron and PVC water and reclaimed water mains shall be all red brass, alloy 85-5-5-5, per ASTM B 62, and shall conform to AWWA C800. 1-inch through 2-inch corporation stops shall be ball type, 300 psi working pressure rated, with AWWA MIP threaded inlets and compression, pack joint, flare, or FIP threaded joint outlets, Mueller as shown in the table below, or an approved equal. All joints made to CTS size HDPE tubing shall use stainless steel insert stiffeners.

Corporation Stops

Pipe Material	Type of Connection	Mueller 300 Model
HDPE	Compression x AWWA IP Thread	B-25028 (Saddle) *
HDPE	Compression x AWWA Taper Thread	B-25008 (Direct Tap) *
HDPE	Pack Joint x AWWA IP Thread	P-25028 (Saddle) *
HDPE	Pack Joint x AWWA Taper Thread	P-25008 (Direct Tap) *
Copper	Compression x AWWA IP Thread	B-25028 (Saddle)
Copper	Pack Joint x AWWA Taper Thread	B-25008 (Direct Tap)
Copper	Pack Joint x AWWA IP Thread	P-25028 (Saddle)
Copper	Pack Joint x AWWA Taper Thread	P-25008 (Direct Tap)
Copper	Flare x AWWA IP Thread	B-25025 (Saddle)
Copper	Flare x AWWA Taper Thread	B-25000 (Direct Tap)
Stainless Steel	FIP Thread x AWWA IP Thread	B-20046 (Saddle)
Stainless Steel	FIP Thread x AWWA Taper Thread	B-20045 (Direct Tap)
* Insert required, part number per manufacturer product information		

B. Potable plastic service pipe material and compression and pack joint connectors shall not be used in soil that is contaminated with low molecular-weight petroleum products, aromatic hydrocarbons, chlorinated hydrocarbons or organic solvents. Appropriate service tubing shall apply.

C. Water and reclaimed water service connections to PVC and DIP mains shall be made using red brass saddles, alloy 85-5-5-5, per ASTM B 62. Straps, washers and nuts shall be brass or stainless steel. No ductile iron, cast iron or steel saddles will be allowed. Saddles shall be Smith Blair 325 Bronze saddles with Stainless Steel or brass extra wide strap or equivalent.

D. Connections to PVC sanitary force mains for services up to 2 inches shall be made using Romac Style 306 double bolt stainless steel service saddles or equivalent.

E. Service and air release valve (ARV) connections to HDPE water, reclaimed water and sewer mains may be made using Romac Style 306H saddle or approved equal. All saddles shall be properly sized per the manufacturer product information and be installed according to the manufacturer's written instructions. Connections to HDPE mains shall not be made using narrower saddles similar to the Smith-Blair 325.

2.10 FLANGED ADAPTERS AND PLAIN END COUPLINGS

Plain end couplings and adapters shall be fusion-bonded epoxy coated carbon steel with Ethylene Propylene Diene Monomer (EPDM) rubber gaskets and stainless steel nuts, bolts and spacers. Acrylonitrile butadiene (NBR) gaskets shall be used for potable water mains that are located in soil that is contaminated with low molecular-weight petroleum products or non- chlorinated organic solvents or non-aromatic organic solvents. Fluorocarbon (FKM) gaskets shall be used for potable water mains that are located in soil that is contaminated with aromatic hydrocarbons or chlorinated hydrocarbons. Fluorocarbon (FKM) gaskets shall be used for potable water mains if the soil is contaminated with aromatic hydrocarbons or chlorinated hydrocarbons, and is also contaminated with low molecular-weight petroleum products or organic solvents. Couplings shall be Dresser Style 38, or another approved equal. Flange adapters shall have a plain end compression seal similar to the style 38, with an ANSI 125 Class flange on the opposite end, and shall be Dresser Style 128W or an approved equal. Stainless steel backup rings shall be used for force mains that are located in corrosive environments including ~~wetwell~~wet wells and valve vaults.

2.11 HOSE BIBS

Hose bibs shall be 3/4" or 1" brass, polished chromium plated brass, with vacuum breaker as noted on the drawings.

2.12 SWING CHECK VALVES

A. Check valves shall be swing type, weighted lever, conforming to AWWA C508. Valves shall be iron-body, bronze-mounted, single disk, 175 psi working pressure for 2- through 12-inch, 150 psi for 14- through 30-inch, with ANSI B16.1 Class 125 flanged ends, by Mueller; No. A-2600-6-01 (sewer), No. A-2602-6-01 (water), or AVK Series 41, or an approved equal.

B. When there is no flow through the line, the disc shall hang lightly against its seat in practically a vertical position. When open, the disc shall swing clear of the waterway.

C. Check valves shall have bronze seat and body rings, extended bronze or stainless steel hinge pins and stainless steel nuts and bolts on bolted covers.

D. Valves shall be so constructed that disc and body seat may easily be removed and replaced without removing the valve from the line. Valves shall be fitted with an extended hinge arm with outside lever and weight.

2.13 HYDRANTS

Hydrants shall be dry barrel, nostalgic style, and shall be AVK Series 2780, American Darling B-84-B, Mueller Super Centurian 250, or approved equal and shall conform to AWWA C502 and UL/FM certified, and shall in addition meet the specific requirements and exceptions which follow:

A. Hydrants shall be according to manufacturer's standard pattern or nostalgic style and of standard size, and shall have one 5-inch Storz connection or equivalent with two 2½- inch hose nozzles.

B. Hydrant inlet connections shall have mechanical joints for 6-inch pipe.

C. Hydrant valve opening shall have an area at least equal to that area of a 5 1/4-inch minimum diameter circle and be obstructed only by the valve rod. Each hydrant shall

be able to deliver 500 gpm minimum through its two 2 1/2 -inch hose nozzles when opened together with a loss of not more than 2 psi in the hydrant per AWWA C502.

D. The upper and lower stem rod shall be stainless steel and shall have a breakable stem-rod coupling of stainless steel, or cast iron or ductile iron with a fusion bonded epoxy coating, with stainless steel pins and clips.

E. Hydrants shall be hydrostatically tested as specified in AWWA C502 and shall be rated at 250 psi minimum.

F. The operating nut shall be 1½ -inch pentagon shaped with a protective weather cover, and open counter clockwise.

G. All nozzle threads shall be American National Standard.

H. Each nozzle cap shall be provided with a Buna N rubber washer.

I. All hydrants shall be traffic break away type and allow for 360 degree rotation to position the Storz connection/nozzle in the desired direction after installation.

J. Hydrants must be capable of being extended without removing any operating parts.

K. Hydrant extensions shall be fusion bonded epoxy coated inside and outside with a stainless steel stem. The breakaway coupling can be fusion bonded epoxy coated or stainless steel. Only one hydrant extension is allowed per hydrant.

L. Weepholes shall be excluded from fire hydrants.

M. Hydrant main valve closure shall be of the compression type opening against the pressure and closing with the pressure. The main valve shall be faced or covered with EPDM elastomer, which shall seat on a bronze ring.

N. Hydrant bonnets, weather cover, nozzle section, caps and shoe shall be cast iron or ductile iron, and shall be holiday free fusion-bonded epoxy coated at the factory, per AWWA C550, inside and outside. Lower barrel shall be fusion bonded epoxy coated inside and outside. Aboveground parts shall also have a top coat of Sherwin-Williams Acrolon 218 HS acrylic polyurethane or approved equal; color Safety Yellow for fire hydrants that are connected to the potable water system or Pantone 522C purple for fire hydrants that are connected to the reclaimed water system.

O. Exterior nuts, bolts and washers shall be stainless steel. Bronze nuts may be used below grade.

P. All internal operating parts shall be removable without requiring excavation.

2.14 RESTRAINED JOINTS

A. Pipe joints shall be restrained by poured-in-place concrete thrust blocks or by other mechanical methods, including tie rods, Stargrip and Allgrip, as manufactured by Star Pipe Products or Megaflange and 2000 PV, as manufactured by EBAA Iron Sales. Flanged joints may be used above ground.

B. All T-bolts, bolts, nuts, washers, and all thread rods shall be stainless steel. The use of rebar with welded thread is prohibited.

A certification from the supplier shall be provided to the County during the shop drawing review process ensuring all T-bolts, bolts, nuts, washers, and all thread rods meet the A-588 requirements and shall state the project name and contractor in the certification letter. If stainless steel is to be used, no certification letter is required.

C. Factory restrained joints shall be Flex-Ring manufactured by American Cast Iron Pipe Company, TR Flex manufactured by US Pipe, or an approved equal.

D. Restrained joint designs that use a restraining gasket shall use Amarillo Fast Grip Gaskets (yellow) as manufactured by American Cast Iron Pipe Co., Barracuda (orange) manufactured by Specification Rubber Products, Inc., or approved equal. Any restraining gasket shall be EPDM rubber and shall have color inherent with the rubber. Color shall not be attained by surface coating.

2.15 TAPPING SLEEVES AND VALVES

A. Tapping valves shall meet the requirements of AWWA C509/C515 with ductile iron body and shall be rated for a pressure of 250 psi. The valves shall be flanged with alignment ring by mechanical joint with a nonrising stainless steel stem. All bolts, nuts and washers shall be stainless steel. Manufacturer shall use Never-Seez or equivalent during assembly of bolt and nut sets to prevent galling of similar metals. Stem seals shall be provided and shall be of the O-ring type, two above and one below the valve's thrust collar. Valve shall be designed for vertical burial and shall open counterclockwise. Operating nut shall be AWWA standard 2-inch square for valves 2 inches and up. Valves shall have an unobstructed waterway equal to or greater than the full nominal diameter of the valve to accommodate full size shell cutter. Gaskets shall cover the entire area of the flange surface and be 1/8-inch minimal thickness of red rubber. The wedge shall be ductile iron fully encapsulated with EPDM rubber. All bolts, nuts and washers between the sleeve and valve shall be stainless steel.

B. Tapping sleeves and saddles shall be stainless steel, seal to the pipe by the use of a gasket compounded for water or sewer, and shall be able to withstand a pressure test of 180 psi for water lines or 150 psi for sewer force mains for one hour with no leakage in accordance with AWWA C110. A stainless steel 3/4-inch NPT test plug shall be provided for pressure testing. All bolts joining the two halves shall be stainless steel and shall be included with the sleeve or saddle; Romac SST III or Romac SST-H.

2.16 TRACER WIRE TEST STATION BOXES

Tracer wire test station boxes shall be provided at plug valves, butterfly valves, blowoff valves, gate valves, fire hydrants and backflow preventers as indicated in these Standards. Tracer wire test station boxes for yard service shall be 2 ½ inch diameter, 15 inch length, ABS plastic with a cast iron rim and lid, P200NFGT as manufactured by Bingham & Taylor, or equal approved by Manatee County. Where test boxes will be in streets or subject to vehicular traffic, use B&T Model P525RD, 5 ¼ -inch diameter or equal, centered in a separate concrete pad similar to a valve box pad.

2.17 INSERTION VALVES

A. The insertion valve shall be 250 psig ductile iron and be a Resilient Wedge Gate Valve designed for use in potable water, raw water, reclaimed water, sewage, irrigation and backflow control systems. The design will allow the valve to be installed into an existing pressurized pipeline while maintaining constant pressure and service as usual. After closing the wedge and adequately restraining the valve body the downstream pipe can be completely removed and replaced (allowing for upsizing of the pipe if necessary). The host pipe shall not be a permanent component of the Insertion valve.

B. The Insertion valve shall be UL listed and approved to NSF / ANSI Standard 61-Drinking Water System Components.

C. Certified Installer:
The insertion valve shall be installed by companies trained and authorized by the manufacturer. All such installers shall have received written certificates and shall provide documentation validating their certification. This will ensure high quality installation and guarantee the warranty of the product.

D. Ductile Iron Construction:
The ductile iron body, bonnet and wedge shall meet or exceed the requirements of AWWA C515. The insertion valve shall be ductile iron construction meeting ASTM A536 Grade 65-45-12.

Chemical and modularity tests shall be performed as recommended by the Ductile Iron Society, on a per ladle basis. Testing for tensile, yield and elongation shall be done in accordance with ASTM E8.

Sizes 12" and smaller must be capable of working on Cast/Grey Iron or Ductile Iron Class A, B, C and D, IPS PVC, C900 and C909 PVC, Steel, AC pipe diameters without changing either top or bottom portion of split valve body.

250 psig maximum working pressure. The pressure rating markings must be cast into the body of the Insertion valve.

After the installation of the insertion valve body on to the existing pipe a pressure test of 1.1 times that of the contents shall be sustained for 15 minutes. Once the pressure test is affectively achieved the insertion valve body must not be moved in accordance with AWWA Standards. If the insertion valve is moved, the pressure test must be completed again. The insertion valve must not be moved or repositioned once the pressure test is achieved.

E. Resilient Wedge Gate Assembly:
The construction of the Resilient Wedge shall comply with AWWA C509 requirements.

The ductile iron wedge shall be fully encapsulated with EPDM rubber by a high pressure and high temperature compression or injection mold process. This will assure the ductile gate is fully coated with molded rubber with no exposed iron.

The resilient wedge shall seat on the valve body and not the pipe to obtain the optimum seating and flow control results. The resilient wedge shall be totally independent of the carrier pipe.

The resilient wedge shall not come into contact with the carrier pipe or depend on the carrier pipe to create a seal.

Pressure equalization on the down or upstream side of the closed wedge shall not be necessary to open the valve.

The wedge shall be symmetrical and seal equally well with flow in either direction.

The Resilient wedge must ride inside the body channels to maintain wedge alignment throughout its travel to achieve maximum fluid control regardless of high or low flow pressure or velocity.

Oversized flow way. Unobstructed to provide optimum flow.

F. Fusion-Bonded Epoxy:
The insertion valve shall be fully epoxy coated on the interior and the exterior. The fusion-bonded coating shall be applied prior to assembly so that even the bolt holes and body-to-bonnet flange surfaces are fully epoxy coated.

The insertion valve shall be coated with a minimum of 10 mils epoxy in compliance with AWWA C550 and certified to ANSI/NSF-61.

G. Gaskets and Triple O-Ring Stem Seals:
This Insertion valve shall have triple O-Ring stem seals, with two O-Rings located above and one O-Ring is located below the thrust collar.

The lower two O-Rings provide a permanently sealed lubrication chamber that will make the valve easier to operate over a longer period of time. The upper O-Ring ensures that sand, dirt or grit cannot enter the valve to cause damage to the lower O-Rings.

Side flange seals shall be of the O-Ring type of either round, oval, or rectangular cross-sectional shape.

H. Valve Stem & Thrust Washers:
The gate valve wedge nut shall be copper alloy in accordance with Section 4.4.5.1 of the AWWA C515 Standard. The gate valve stem shall be stainless steel.

The NRS stem shall have an integral thrust collar in accordance with Section 4.4.5.3 of AWWA C515 Standard. Two-piece stem collars are not acceptable. The wedge nut shall be independent of the wedge and held in place on three sides by the wedge to prevent possible misalignment.

Two thrust washers shall be used with one located above and one located below the stem thrust collar..

NRS with AWWA standard turns.

Operated by 2” square wrench nut according to ASTM A126 CL.B – open left or open right

I. American Made:

All primary parts and components shall be exclusively and completely assembled, manufactured, machined and coated in the USA. The Owner shall, with reasonable notice, have the right to plant visitation at his/her expense.

J. Hardware:
Hardware shall be stainless steel. Bolting materials shall develop the physical strength requirements of ASTM A307 with dimensions conforming to ANSI B18.2.1.

K. Extended Life Value:
The stuffing box, operating stem and resilient wedge (complete bonnet and all moving parts) shall be removable, repairable and or replaceable under pressure. In other words, even while the valve is fully pressurized in the system all moving components can be removed under pressure. In the event the valve stem is broken or damaged the bonnet can be removed under pressure.

L. Split Restraint Devices:
The split restraint devices shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110/A21.10.

The devices shall have a working pressure rating of 350 psi for 4-12 inch. Ratings are for water pressure and must include a minimum safety factor of 2 to 1 in all sizes.

Chemical and modularity tests shall be performed as recommended by the Ductile Iron Society, on a per ladle basis. Three test bars shall be incrementally poured per production shift as per U.L. specifications and ASTM A536. Testing for tensile, yield and elongation shall be done in accordance with ASTM E8.

Gland body wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536.

Mechanical joint restraint shall require conventional tools and installation procedures per AWWA C600, while retaining full mechanical joint deflection during assembly as well as allowing joint deflection after assembly.

Proper actuation of the gripping wedges shall be ensured with torque limiting twist off nuts. Set screw pressure point type hardware shall not be used.

M. The insertion valve shall be InsertValve by Team Industrial Services.

PART 3 EXECUTION

3.01 INSTALLATION

A. All valves and appurtenances shall be installed in the location shown, true to alignment and rigidly supported. Any damage occurring to the above items before they are installed shall be repaired to the satisfaction of the County.

B. After installation, all valves and appurtenances shall be tested at least two hours at the working pressure corresponding to the class of pipe, unless a different test pressure is specified. If any joint proves to be defective, it shall be repaired to the satisfaction of the County.

C. Install all floor boxes, brackets, extension rods, guides, the various types of operators and

appurtenances as shown on the Drawings that are in masonry floors or walls, and install concrete inserts for hangers and supports as soon as forms are erected and before concrete is poured. Before setting these items, the Contractor shall check all plans and figures which have a direct bearing on their location and he shall be responsible for the proper location of these valves and appurtenances during the construction of the structures.

D. Pipe for use with flexible couplings shall have plain ends as specified in the respective pipe sections.

E. Flanged joints and mechanical joints shall be made with 316 stainless steel bolts, nuts and washers.

F. Prior to assembly of split couplings, the grooves as well as other parts shall be thoroughly cleaned. The ends of the pipes and outside of the gaskets shall be moderately coated with petroleum jelly, cup grease, soft soap or graphite paste, and the gasket shall be slipped over one pipe end. After the other pipe has been brought to the correct position, the gasket shall be centered properly over the pipe ends with the lips against the pipes. The housing sections then shall be placed. After the bolts have been inserted, the nuts shall be tightened until the housing sections are firmly in contact, metal-to-metal, without excessive bolt tension.

G. Prior to the installation of sleeve-type couplings, the pipe ends shall be cleaned thoroughly for a distance of 8". Soapy water may be used as a gasket lubricant. A follower and gasket, in that order, shall be slipped over each pipe to a distance of about 6" from the end.

H. Valve boxes with concrete bases shall be installed as shown on the Drawings. Mechanical joints shall be made in the standard manner. Valve stems shall be vertical in all cases. Place cast iron box over each stem with base bearing on compacted fill and the top flush with final grade. Boxes shall have sufficient bracing to maintain alignment during backfilling. Knobs on cover shall be parallel to pipe. Remove any sand or undesirable fill from valve box.

3.02 HYDRANTS

A. Hydrants shall be set at the locations designated by the County and/or as shown on the Drawings and shall be bedded on a firm foundation. A drainage pit on crushed stone as shown on the Drawings shall be filled with gravel or crushed stone and satisfactorily compacted. During backfilling, additional gravel or crushed stone shall be brought up around and 6" over the drain port. Each hydrant shall be set in true vertical alignment and shall be properly braced. Concrete thrust blocks shall be placed between the back of the hydrant inlet and undisturbed soil at the end of the trench. Minimum bearing area shall be as shown on the plans. Felt paper shall be placed around the hydrant elbow prior to placing concrete. CARE MUST BE TAKEN TO INSURE THAT CONCRETE DOES NOT PLUG THE DRAIN PORTS. Concrete used for backing shall be as specified herein.

B. When installations are made under pressure, the flow of water through the existing main shall be maintained at all times. The diameter of the tap shall be a minimum of 2" less than the inside diameter of the branch line.

C. The entire operation shall be conducted by workmen thoroughly experienced in the installation of tapping sleeves and valves, and under the supervision of qualified personnel furnished by the manufacturer. The tapping machine shall be furnished by the Contractor if tap is larger than 12" in diameter.

D. The Contractor shall determine the locations of the existing main to be tapped to confirm the fact that the proposed position for the tapping sleeve will be satisfactory and no interference will be encountered such as the occurrence of existing utilities or of a joint or fitting at the location proposed for the connection. No tap will be made closer than 30" from a pipe joint.

E. Tapping valves shall be set in vertical position and be supplied with a 2" square operating nut for valves 2" and larger. The valve shall be provided with an oversized seat to permit the use of full sized cutters.

F. Tapping sleeves and valves with boxes shall be set vertically or horizontally as indicated on the Drawings and shall be squarely centered on the main to be tapped. Adequate support shall be provided under the sleeve and valve during the tapping operation. Sleeves shall be no closer than 30" from water main joints. Thrust blocks shall be provided behind all tapping sleeves. Proper tamping of supporting earth around and under the valve and sleeve is mandatory. After completing the tap, the valve shall be flushed to ensure that the valve seat is clean.

3.03 SHOP PAINTING

Ferrous surfaces of valves and appurtenances shall receive a coating of rust-inhibitive primer. All pipe connection openings shall be capped to prevent the entry of foreign matter prior to installation.

3.04 FIELD PAINTING

All metal valves and appurtenances specified herein and exposed to view shall be painted safety blue.

3.05 INSPECTION AND TESTING

All pipelines shall remain undisturbed for 24 hours to develop complete strength at all joints. All pipelines shall be subjected to a hydrostatic pressure and leak testing. Refer to Manatee County Public Works Utility Standards Part 1-Utility Standards Manual Section 1.8.7. Prior to testing, the pipe lines shall be supported in a manner approved by the County to prevent movement during tests.

All leaks shall be repaired and lines retested as approved by the County.

END OF SECTION

DIVISION 3 -

CONCRETE

SECTION 03500 LIFT STATION SPECIFICATION

PART 1 GENERAL

Furnish all labor, materials, equipment and incidentals required to install complete grinder style, automatic, underground lift station with all required equipment as indicated on the construction plans and described herein. The principal items of equipment shall include two submersible motor-driven sewage pumps, valves, internal piping, automatic pumping level controls, control panel and telemetry(most current model). All materials shall be new, without defects and of the best quality. All materials furnished and all work done shall be in strict accordance with the National Electrical Code and all local requirements and codes. ~~All materials furnished and all work done shall be in strict accordance with the National Electrical Code and all local requirements and codes.~~

All lift stations that re-pump sewage from four (4) other upstream lift stations or has a discharge flow 500 gpm or greater shall have an on-site back-up diesel pump equipped with a transducer level controls, and backup float switches. Re-pump station may require an in-line submersible magnetic flow meter (as determined by County), and a force main pressure transducer. Onsite full tanks shall not exceed 540 gallons. (not applicable)

Alternatively, at the discretion of the County, an electric generator equipped with an automatic power transfer switch may be installed. (not applicable)

Bidders shall note that this Section reflects Manatee County's standard pump station specifications and contains requirements that are not applicable to a grinder pump station installation. Bidders should refer to Part 3.01 Grinder Pump (Lift) Stations and the Contract Drawings for requirements.

1.01 STRUCTURES AND EQUIPMENT

A. Pump Station ~~Wetwell~~Wet Well.

All ~~wetwell~~wet wells 6 feet diameter and larger, and all pump stations that are owned and maintained by Manatee County, shall be precast polymer concrete, in accordance with Section 03420, ~~with a full protective liner, in accordance with section 1.12,~~ designed to accommodate the peak hour development flow from all contributing areas. The wet well shall have a minimum of 4 feet from the lowest invert to the wet well bottom. The pump station ~~wetwell~~wet well size shall be determined using the following formula to determine the minimum volume between the off-level elevation and the influent invert elevation:

MIN. VOLUME (GALS.) = PUMP CAPACITY (G.P.M.) X 4

~~Wetwell~~Wet well diameters shall be 6 feet or larger. 4-foot and 5-foot diameter ~~wetwell~~wet wells shall be used only for special grinder pump applications as approved by the County on a case-by-case basis. The minimum wall thickness for polymer concrete ~~wetwell~~wet wells with liners shall be per Specification Section 03420.~~as follows:~~

~~DIAMETER~~	~~WALL THICKNESS~~	~~DIAMETER~~	~~WALL THICKNESS~~
~~4' - 0"~~	~~8"~~	~~8' - 0"~~	~~8"~~
~~5' - 0"~~	~~8"~~	~~10' - 0"~~	~~10"~~
~~6' - 0"~~	~~8"~~	~~12' - 0"~~	~~12"~~

The pump station ~~wetwell~~wet well size and control equipment shall be designed to limit the pumping cycles of each pump to a maximum of 5 starts per hour for duplex stations and 3 starts per hour for triplex stations. Pump stations discharging through pipes 12 inches or larger shall have more than two variable speed pumps. The pump cycle off level shall be no lower than the top of the sewage pumps. The lead pump on level shall be no higher than 18 inches below the invert elevation of the influent pipe for duplex stations, and no higher than 24 inches below the invert for triplex stations.

All pump stations shall have a single gravity-flow influent pipe discharging into the ~~wetwell~~wet well. Multiple gravity pipelines and force mains upstream shall all terminate at a separate polymer concrete manhole before flowing into the pump station ~~wetwell~~wet well. The influent gravity sewer shall be aligned, so that the inflowing stream drops into the front side of the wet well opposite from the riser side, within an angle of 25 degrees on either side of the centerline passing between both pumps in a duplex station, or between two of the three pumps in a triplex station. As an option to the to the influent gravity sewer main entering the ~~wetwell~~wet well directly between the pumps, a plastic composite/fiberglass drop bowl and pipe (Reliner/Duran, Inc. or equal) shall be installed, as shown on Detail US-20.

B. Above-ground Valve Assembly

An above-ground valve assembly and concrete pad with three gate valves, two weighted lever swing check valves, and a pump-out connection shall be constructed adjacent to the wet well. Tri-plex stations have four gate valves and three check valves. The pump-out connection shall be equipped with a gate valve and an male aluminum quick-coupler; 4-inch for 4 inch or smaller valve assemblies; 6 inch for all others, unless otherwise specified on the plans. All valves shall have factory applied, fusion bonded epoxy coating on interior and exterior. All bolt, nuts & washers in or on the wet well or valve assembly shall be 316 stainless steel.

The valve assembly shall be supported by 316 stainless steel adjustable, flange-type, pipe supports anchored to the structure/valve pad. 6-#5 rebar shall be epoxy doweled into the wet well 3-4 inches and cast into the valve assembly slab 3-4 feet.

C. ~~A precast meter vault for a single submersible magnetic flow meter may be required following the valve assembly. It shall also have a 3-inch PVC drain installed at a 2 percent slope and with a P-trap installed inside the wet well. The meter vault shall be of adequate size to allow a minimum 18 inches clearance between all flange fittings and any concrete surfaces.~~

~~D.~~ Entrance Hatches

The lift station ~~wetwell~~wet well ~~and/or meter vault~~ shall be equipped with an aluminum access cover of adequate size to permit easy removal and installation of sewage pumps and equipment. The ~~wetwell~~wet well access cover shall be a minimum 36" x 48" single (preferred) or double door. ~~The meter valve pit access cover shall be a minimum 48" x 48" double door.~~ The dimensions of the hatch will vary depending on the internal discharge pipe size and internal configuration, the actual required dimensions of the hatch shall be confirmed with the pump manufacturer prior to ordering. ~~All~~ The access covers shall be constructed of aluminum with a minimum load rating of 300 lbs/sq. ft. and equipped with 316 stainless steel hinges, a recessed lifting handle which lies flush with the door surface, and a 316 stainless steel staple which may be used to secure the door with a padlock when

closed. The doors shall have a raised diamond thread pattern to provide a skid resistant surface and shall open to 90 degrees and lock automatically in that position, with a handle to release the doors for closing. ~~The hatch assemblies shall be as manufactured by U.S. Foundry, Halliday, or an approved equal.~~

~~E~~D. Sewage Pump Assemblies

Each pumping station shall have a minimum of two identical, totally submersible sewage pump assemblies which are rated and suitable for continuous duty, underwater operation. These units and their associated power and signal cables shall have watertight integrity to a depth of 65 feet. The pump, pump motor and associated components shall all be the products of the same manufacturer. Pump assemblies shall be painted after assembly with an approved air dry enamel which will adequately protect the exterior housings from the corrosive environment in the wastewater sewer system. Coating thickness shall be a minimum of 4 mils.

Pumps shall be selected to operate within 10 percent of the Best Efficiency Point (BEP). The overall lift station system shall be designed to allow for the selected pumps to operate within 10 percent of their BEP.

Factory testing of the pump assemblies shall be required and as a minimum, shall include:

(1) All tests recommended by the manufacturer.
(2) Verify the integrity of assembly and connections (no leaks, tightness of hardware, proper alignment, assembly, etc.) and that the nameplate and specified pump and pump motor (HP, Voltage, Phase and HZ) correspond.
(3) The motor windings and seal housing chambers shall be hi-potted to test for insulation defects and moisture content. Check the resistance of the stator windings with a bridge to verify that the readings of all three phases are basically equal and within tolerance.
(4) Energize pump motor, verify direction of rotation and that it corresponds to the nameplate.
(5) Provide a written report of all testing with the shipped pump.

All pump assemblies shall be warranted against defects in workmanship and materials for whichever is the greater of: a 5-year pro-rated warranty from the date of purchase or as provided in the Defect Security Agreement with the County.

Month 0 –18 = 100% Month 19-31 = 75% Month 32-45 = 50% Month 46-60 = 25%

Pump motors shall have the following electrical characteristics: 230 -volt for 20 HP and lower or 460 –volt for greater than 20 HP, 3 phase, 60 hertz, minimum service factor of 1.15, continuous duty, maximum NEMA LRA/HP code of J, and NEMA Design B. Pump motors shall be non-overloading throughout the entire range of operation. The pump motors are to be induction motors which are built with moisture resistant Class F insulation. Each motor shall be capable of a minimum of 10 starts per hour without degradation of the windings. The pump motor shaft shall be made from a single, solid, forging of 303 (or better grade) stainless steel, tapered, keyed, and supported by a minimum of one heavy duty upper radial ball bearing and a minimum of one heavy duty lower thrust bearing. The bearings shall have a minimum B-10 life rating of 60,000 hours. The shaft and shaft extension shall be of minimum length and maximum diameter to reduce shaft deflection and prolong bearing life. The pump motor shall be designed for pumping at a maximum sump ambient of 40 degrees

C (104 degrees F). The stator of the pump motor shall be copper wound (aluminum stator windings are not permitted) and equipped with at least two heat sensors (klixons installed in the stator end turns) which will shut the motor off in case of excessive heat built up. The heat sensors shall be connected in series with the motor starter coil so the starter is tripped if the heat sensor opens. The pump motor housing shall be oil or air filled type for cooling purposes. Oil filled motors shall use pure dielectric insulating oil. The pump motor shall be capable of operating at +/- 10% of rated voltage and +/- 5% of rated frequency without excessive heating. The pump motor shall not exceed a rise by resistance of 90 degrees C at full load over the entire performance curve. It shall be able to operate intermittently a full load while unsubmerged without damage. Power cables and signal cables shall be continuous (without splices from the pump motor to the power supply). Power cables shall be sized for operation at the rated service factor. The power cable shall be a single, multi-conductor, STW-A type that is epoxy potted and compression fitted for water tight sealing into the pump cable entry. As a minimum, the nameplate for the pump motor shall include: MODEL/SERIAL NUMBER, HORSEPOWER, VOLTAGE, FULL LOAD AMPS, FULL LOAD RPM, PHASES, FREQUENCY, NEMA LRA CODE, NEMA DESIGN, INSULATION CLASS, AMBIENT TEMPERATURE, LEAD CONNECTIONS FOR DIRECTION OF ROTATION, TYPE OF DUTY, TYPE OF BEARINGS, and PUMP IMPELLER SIZE. All electrical components used in or in conjunction with the sewage pump assembly shall be UL approved when UL approval is available for that type component.

The pumps shall be capable of pumping raw, unscreened sewage and able to pass a minimum 3-inch solid. Each pump shall have an enclosed cast iron or ductile iron impeller and shall be equipped with a bronze wear ring. The pump lifting cover, stator housing, and volute casing shall be gray cast iron, ASTM A48, Class 30. Castings shall have smooth surfaces that are devoid of blow holes or other casting defects. The pump lifting bail shall have a minimum of 4-inch diameter clear opening and shall be cast as part of the motor cover or fabricated from 316 stainless steel. All fasteners exposed to raw sewage shall be 316 stainless steel. The backside of the impeller shall have pump-out vanes to keep contaminates out of the seal area. The impeller shall be dynamically balanced, and shall be single - or multi-vaned, with an enclosed or recessed, non-clogging design. There shall be a maximum clearance of .125 inches between the seal housing and the top of the impeller. The pump shall have a minimum of two mechanical seals mounted in tandem with an oil chamber between the two seals. The oil chamber of each pump shall be equipped with an electric seal fail sensor which shall be connected to an indicating light at the control panel to annunciate a seal failure and a set of relay contacts for purposes of remote notification via the County RTU system. The unit shall be designed so that when the outer seal fails, the contaminates that enter shall not enter the bearing housing and cause damage to the bearings. The inner seal shall be replaceable without disassembly of the motor housing and without the need for special tools. As a minimum, the rotating seal faces shall be carbon and the stationary seal faces shall be ceramic. All pumps shall be center-line discharge type constructed so that the discharge flange supports the full weight of the pump. Pump assemblies shall be complete with ductile iron or gray cast iron BPIU discharge base elbows that are bolted directly to a base plate which is bolted directly to the ~~wetwell~~wet well floor, guide flange adapter and guide rails. The discharge elbow shall have an automatic coupling end facing the pump and an ANSI Class 125 flanged end ready for connection to the flange of the riser pipe. The design of the pump assembly installation shall be such that the pump will be automatically connected to the discharge piping when lowered into place along the guide rails, and shall seal leak-tight to the discharge base elbow by the weight of the pump assembly resting in the installed position. The pump base elbow shall be mounted on an ASTM A588 (COR-TEN) steel mounting plate that is level and is bolted to the ~~wetwell~~wet well floor using ¾-inch 316 stainless steel threaded rods with Hilti HVA anchors or approved equal anchors and shall have base ell mounting bolts of ¾-inch 316 stainless steel that are

mounted in place and welded to the plate. The pump guide rails for each pump shall be constructed of two separate whole length sections of 2 inch Schedule 40, 316 stainless steel pipe set 4 inches on center.

The pump assemblies shall be easily removed for inspections or service, requiring no fasteners to be removed or disconnected, and no need for personnel to enter the confined space of the ~~wetwell~~wet well, by simply hauling up on the lift chains. The lifting chains shall be type 316 stainless steel, and shall be 1/4-inch for pumps less than ~~10~~ 25 HP and 3/8-inch for pumps ~~10~~ 25 HP and greater, or as required by the pump assembly weight. Chains shall be attached to the pump lifting bails using stainless steel shackles and shall extend to the inside top of the ~~wetwell~~wet well. All rails and mounting hardware shall be 316 stainless steel.

~~F~~E. Riser and Fittings

All force main piping and fittings within the ~~wetwell~~wet well~~, valve assembly, and the meter vault~~ from the pump base elbow to the check valve, shall be DR11 HDPE, only ~~90 degree~~ molded HDPE fittings shall be used upstream of the check valves. The HDPE discharge piping from the pump base ells (in the wet well) and to the valve assembly check valves shall be connected using HDPE flange adapters with 316 stainless steel backup rings. No ductile iron bodied fittings shall be located between the pump base elbow and the check valves. All HDPE connections shall be thermal fused. All piping downstream of the tee/cross in the valve assembly to the first underground fitting shall be ductile iron pipe, after which PVC DR-18 shall be used. ~~All connections to iron bodied flange fittings in the wetwell (pump base ells) and to the valve assembly check valves shall be made using HDPE flange adapters with 316 stainless steel backup rings. No iron bodied fittings shall be located between the pump base elbow and the check valves. All HDPE connections shall be thermal fused or electro-fused. Piping from the valve assembly tee to the first underground fitting shall be ductile iron, after the first underground fitting shall be PVC DR 14 C-900.~~

All flanged fittings ~~inside the wetwell and valve assembly~~ shall use 316 stainless steel bolts, nuts and washers. All threads shall be treated with Bostik Never-Seez anti-seizing compound or approved equal. All bolts on the flange connection at the pump base ells shall have two nuts with a lock washer between them or a nylon lock nut.

All stainless steel fasteners shall be treated with Never-Seez prior to assembly and torque according to the fitting manufacturer's recommendation. ~~The bands around the piping shall be constructed from a minimum of 1 inch wide by 12 gauge stainless steel strap stock, shaped to fit the piping and sized to grip the piping without deforming the pipe when bolted to the braces.~~

The riser pipes shall be attached to riser pipe brackets by 316 stainless steel U-bolts. The U-bolts shall be tightened to secure the riser pipe as to grip the pipe without deforming the pipe when bolted to the brackets. The riser pipe brackets shall be constructed of 316 stainless steel 2 inch tubing (or 2 inch 316 stainless steel angle) with 6"x6"x1/4" 316 stainless steel plates welded to each end and attached to the wet well walls by two (min) 316 stainless steel anchors.~~For wetwells up to 6 feet in diameter and pipe less than 8 inches, the pipe support system shall be constructed using 1 5/8 inch stainless steel channel. For wetwells 8 feet in diameter and larger or pipe 8 inches and larger, the pipe support system shall be constructed using 4 inch stainless steel angle.~~

~~G~~F. Hardware

A multi hook stainless steel hanger shall be installed inside the ~~wetwell~~wet well access opening for
supporting the float switches and pump electric cables. The multi hook hanger shall be constructed from ¼-inch x 2-inch type 316 stainless steel flat stock with individual hooks constructed of ¼" type 316 stainless steel rod stock. Individual hangers shall be installed on each side of the upper guide rail bracket for each pump to support the pump lifting chain and power cable. The lifting chain hook shall be constructed from 3/8-inch type 316 stainless steel rod stock. The pump power cable hook shall be constructed from 1/4-inch x 1-inch type 316 stainless steel flat stock.

~~H~~G. Painting and Coating

All paint and other coatings shall be applied in accordance with the product manufacturer's specifications for the surfaces being coated. All iron body valves shall have a factory applied fusion bonded epoxy coating inside and outside. All ductile iron fittings shall have an approved factory applied epoxy coating inside and outside~~a 40-mil Protecto 401 or equal epoxy on the inside in accordance with manufacturer's specifications and an asphaltic coating on the outside~~. No field-applied paintings or coatings shall be applied to the valves or fittings.

H. Stilling Well (where required)

A stilling well may be required, and if so, shall be a 6" PVC stilling well mounted such that the top is available to an open hatch cover. The bottom of the stilling well shall have two 316 stainless steel bolt all the way through both sides, passing through the center of the pipe, approximately 4" from the base of the pipe. It shall have ½" diameter holes drilled around the circumference at a rate of one hole per inch of length for at least the full wetted height. All mounting hardware shall be 316 stainless steel.

I. Magnetic Flow Meter (where required)

A flow meter may be required, and if so, ~~flow meters installed in a separate meter vault~~ shall be rated for continuous submergence, 0.05% accuracy with a polyurethane liner, flush electrodes, FM Class 1, Division 2, Groups A, B, C & D and shall be constructed for a flanged mount. Meter shall be supplied with a like size spool piece. The exterior control module/transmitter shall be mounted either inside or adjacent to the lift station control panel on the same support structure per the Lift Station Supervisor.

2.01 ELECTRICAL

A. Service and Metering (where required)

The Contractor shall be responsible and shall pay for any permits, fees, and inspections required by the local power company for service installations. Three phase power shall be used unless otherwise approved by the County. Service for pump motors of 20 horsepower or smaller shall be 230 volts. For motors greater than 20 horsepower, the service voltage shall be 460. No phase converters will be accepted. All lift stations shall be equipped with a knife-type fused safety switch in a NEMA 4X stainless steel enclosure, lockable in the ON and OFF position, between the service meter and the control panel to permit servicing of the main breaker without removing the service meter. All meter bases shall be aluminum.

Minimum service size shall be 100 amp. Conduit connections to the disconnect shall be sealed using Myers conduit hub connectors (disconnect side).

B. Conductors

All power conductors shall be single conductor, 600 volt, type THW or THHN stranded copper. Minimum conductor size shall be #12 AWG. ALUMINUM WIRE IS NOT PERMITTED. All control wiring shall be single conductor #14 AWG, 600 volt, type THHN stranded copper. All terminations and interconnections of control wiring shall be by means of compression-type lugs of the nylon self-insulated type with an inner bronze insulation grip sleeve on identified terminal strips. All control wiring shall be color coded as indicated on the standard details.

C. Conduit

All power conductors from the utility source to the service meter shall be enclosed in PVC Schedule 80 conduit below ground and aboveground (NO I.M.C. ALLOWED). All lift stations shall be equipped with one conduit to the wet well for each pump power cables and a separate conduit to the wet well for the control (floatball) and signal cables. In lift stations with large horsepower pumps and pumps equipped with sensor cables, the conduit size and quantity shall be determined by the County. All conduit to the lift station wet well shall be minimum 2" Schedule 80 PVC and shall be run by the shortest route possible. All terminations shall be made inside the electrical control panel. All flexible conduit shall be non-metallic.

D. Control Panel

All pump stations shall have one automatic control panel, one telemetry control unit enclosure with specified TCU (most current model) with assigned radio frequency and one junction control box for motor control, floats, seal fail and transducer ~~(if required)~~. The control panel will be ordered through Barney's Pump of Lakeland, FL. The telemetry control cabinet will be ordered through Data Flow Systems (DFS), part# RJ1816HPL~~DFS-00275-008-04~~. Specify if 480V 3 phase is needed. Enclosure must be ordered with 'NO" tower mounting brackets.

All cabinets shall be white in color unless specified otherwise. The 304 S.S. control cabinet and junction box shall be powder coated white.

The Order Numbers and specification are listed below.

Barney's Pumps approved panels by Manatee County

Part#	STD. FLA	MCB/ECB	PCB	Starter	Size (Starter or OL)	Note:
ManCoCP240_1_3_VFD	24 (Input)	100	40	FRN003E1S-7U	N/A	11A Max Pump FLA (VFD)
ManCoCP240_1_5_VFD	42.7 (Input)	125	70	FRN010E1S-2U	N/A	19A Max Pump FLA (VFD)
ManCoCP240_3_2_SSC	8.3	100	15	SSR	3-12A	Solid State Starter

ManCoCP240_3_3_SSC	9.5	100	15	SSR	3-12A	Solid State Starter
ManCoCP240_3_5_SSC	15.3	100	25	SSR	10-40A	Solid State Starter
ManCoCP240_3_7.5_SSC	25.2	100	40	SSR	10-40A	Solid State Starter
ManCoCP240_3_10_SSC	29.5	100	50	SSR	10-40A	Solid State Starter
ManCoCP240_3_15_SSC	44.2	125	70	SSR	25-100A	Solid State Starter
ManCoCP240_3_20_FVNR	54.4	175	90	14HUG32AF	Size 3	Elect-mech starter
ManCoCP240_3_25_FVNR	68	200	100	14HUG32AF	Size 3	Elect-mech starter
ManCoCP480_3_2_SSC	4.1	100	15	SSR	3-12A	Solid State Starter
ManCoCP480_3_3_SSC	4.8	100	15	SSR	3-12A	Solid State Starter
ManCoCP480_3_5_SSC	7.8	100	15	SSR	3-12A	Solid State Starter
ManCoCP480_3_7.5_SSC	12.6	100	20	SSR	10-40A	Solid State Starter
ManCoCP480_3_10_SSC	14.7	100	25	SSR	10-40A	Solid State Starter
ManCoCP480_3_15_SSC	22.1	100	40	SSR	10-40A	Solid State Starter
ManCoCP480_3_20_SSC	27.2	100	50	SSR	10-40A	Solid State Starter
ManCoCP480_3_25_SSC	34	100	60	SSR	10-40A	Solid State Starter
ManCoCP480_3_30_SSC	40.1	110	70	SSR	25-100A	Solid State Starter
ManCoCP480_3_40_FVNR	52.2	125	80	14HUG32AF	Size 3	Elec-mech Starter
ManCoCP480_3_50_FVNR	70.5	175	110	14HUG32AF	Size 3	Elec-mech Starter

All part numbers include junction box
Fuji Inverters/VFD's only
Part number for cabinets that are single phase does not include inverters - sold separately.

The control panel, telemetry control cabinet, and motor cable junction box along with the safety switch box and electric utility power meter, shall be attached to horizontal support channels with stainless steel fastening systems designed for use with the support channel. The horizontal channels shall be 1-5/8 inch, 12 gage (or thicker) solid stainless steel channels (Uni-strut, BLine or County approved equal), attached with stainless steel 3/8-inch all thread rod with stainless steel flat washers and nuts to two vertical 3 inch diameter stainless steel, schedule 40 postsattached with stainless steel two piece pipe clamps or stainless steel U-bolts to two vertical 3 inch diameter stainless steel, schedule 40 pipes. The pipe clamp or U-bolt ends shall be covered with plastic caps to prevent injury to personnel. The 3 inch vertical pipe shall have plastic end caps or stainless steel end caps at the top and shall be anchored in concrete adjacent to the pump station wetwellwet well. See County Standard, "Sewage Pump Station Meter & Electrical Details". No fittings shall enter from the top or back of the control panel. All fittings shall enter the side or bottom of the control panel and shall penetrate the control panel with either sealing locknuts or Myers Hubs.

The overall control panel shall be a minimum of 30"x 36"x 12" deep and of adequate size to completely cover (without crowding) all wiring and components mounted inside it. It shall have provisions for the mounting of all basic and optional controls and instrumentation. Install engraved nameplates defining door mounted hardware. The electrical control panel shall have a complete wiring schematic which is laminated in plastic and attached to the inside of the outer control panel door.

All components shall be installed per the most current NEMA and NEC regulations and standards. The components shall be industrial NEMA rated (I.E.C. is not acceptable) and UL approved when UL approval is available for that particular type component. The components of the panel shall be held in place with stainless steel, slotted, plan head machine screws with star type washers. The panel shall be tapped to accept the mounting screws of the components and no self-tapping type screws shall be used. The control panel shall have the following items installed on the back plane or on aluminum "high hats" attached to the back plane, so the body of the component is flush with the dead front door to allow operation and reset of the components without opening the dead front door: main power breaker, emergency power circuit breaker, individual pump circuit breakers, control circuit breaker and G.F.I. duplex receptacle circuit breaker. The control panel shall have the following items installed directly to the back ~~panel~~plane: individual motor starters, power distribution blocks, neutral bar assembly, grounding bar/lugs, terminal strips, 2 inch PVC conduit for control and telemetry wiring and fuses, and surge suppressor. The control panel shall have one G.F.I. duplex receptacle installed on the dead front door. The exterior of the control panel shall have one emergency generator receptacle, one flashing red light, and one audible alarm with reset button. The individual placement of all the components of the control panel shall be installed as indicated in the standard details.

E. Ratings

The controls shall be rated for the supply voltage (230 or 460 volts), 3 phase, 60 hertz. In the event that three phase power is not available at the location of the control panel, the cabinet shall be either ManCOCP240 1 3 VFD (3 hp) or ManCoCP240 1 5 VFD (5 hp) inverters. All control voltage to the ~~wetwell~~wet well shall not exceed 24 volts DC.

F. Wiring Method

All power conductors from the main circuit breaker to all other circuit breakers shall be connected via a Square D model LBA363206, Marathon #1333555, or equal power distribution block. All electrical panel components shall have individual neutral wires. All neutral wiring shall be connected via a Square D model SN12-125 neutral assembly. Wiring is to be continuous with no splices between connections. Provide a Square D model PK9GTA grounding bar at the bottom of the backplate. This grounding bar will be the central connection point of all ground wires for the system with the exception of the pump power cords and surge arresters. The pump power cords and surge arresters shall be grounded via individual ground lugs that are to be attached to the control panel back plane. Provide two 12 terminal, Ideal Model 89-208 terminal strips to make electrical connections in the control panel. One terminal strip shall be used exclusively for 24 volt connections (TB-1) and the other shall be used exclusively for 120 volt connections (TB-2). The power distribution block, neutral assembly, grounding bar and terminal strips shall be located as indicated in the standard details. Use stainless steel screws and fasteners for all wiring connections.

G. Circuit Breakers

The panels shall be equipped with main and emergency circuit breakers for a minimum size of service of 100 amps. The main and emergency circuit breakers shall be interlocked so that when one is in the open position, the other circuit breaker must be in the closed position. There shall also be an individual circuit breaker for each pump, a control circuit breaker, a 20 amp circuit breaker for site lighting, a 20 amp circuit breaker for the flow meter (re-pump stations only) and a minimum 20 amp circuit breaker for the 120 volt GFI protected convenience outlet that is mounted on the inner control panel door. All circuit breakers shall

be mounted in the control panel per the standard details. The circuit breakers shall be of the heavy duty thermal magnetic trip variety. For circuit breakers up to 100 amps, use Square D series QOU or County approved equal. For circuit breakers greater than 100 amps, use Square D "Mag Guard" series with adjustable trip for the pumps, main and emergency breakers shall be Square D QBL, HGL, or JGL.

H. Motor Starters

Pump motors shall each have a NEMA-rated, solid state or magnetic starter sized as called for on the construction plans. No starter smaller than NEMA size 1 shall be used. Starters shall be solid state, full voltage, non-reversing type. These starters shall be Siemens series ESP-100 or County approved equal with special phase loss protection and a special factory coating of the solid state circuit boards which prevents hydrogen sulfide damage. The starters shall be equipped with under voltage release and overload protection on all three phases. The motor starter contacts (if used) shall be constructed so that they may be easily replaced without removing the starter unit from its mounted position. The overload reset device shall be operable without having to open the inner swing panel.

I. Lightning Arresters

There shall be a Ditek DTK Series ~~, Category B or Square D~~ lightning arrester/surge suppressor installed on the incoming power source. It shall be mounted on the bottom exterior or placed inside of the safety switch enclosure and connected to the LOAD SIDE of the safety switch and overload reset.

The main circuit breaker and the RTU circuit breaker shall also each have a Ditek CM+Series lightning arrester/surge suppressor connected to the load side of the breaker wiring. These lightning arresters/surge suppressors shall be mounted with the supplied adhesive strip on the back of the "high hat" supporting the breakers. The exact model lightning arresters/surge suppressors shall be based on the voltage and number of phases of the protected circuits.

J. Liquid Level Switches and Sensors

A minimum of four float switches are to be installed in the ~~wetwell~~wet well to monitor and control liquid level height. The switches shall be a single pole mechanical type switch (as manufactured by MDI, Connery Manufacturing, or County approved equal). They shall be designed to actuate when the longitudinal axis of the float is horizontal, and deactuate when the liquid level falls one inch below the actuation elevation. The switching arrangement shall be normally open when deactivated. The output leads shall be connected in the control panel as shown in the standard details. The control voltage to the level switches shall be 24 volts DC and the switches shall be sized to operate at that voltage. In addition to the above, pump stations that re-pump sewage flows (directly or indirectly) from other pump stations shall have a Dylix model GXS3-PP300-A49-B49(~~-~~50)-CO1~~-D49~~ pressure transmitter mounted inside a stilling well as the primary level sensor.

The wiring connecting the cable junction box to the ~~wetwell~~wet well floats shall be a continuous length (no splices) of flexible rate 600 volt, minimum diameter of #18, type S.O. cable. The float switches shall have all connections made inside the junction box using crimp on spade terminals that are landed to the terminal strip. The wiring shall be installed so there is a minimum of four feet, and a maximum of 6 feet, of excess cable in the ~~wetwell~~wet well for relocation of the float switches.

K. Alarms

Each pump station shall have one flashing red light ~~and one audible alarm with silence button~~ to signal high level conditions. ~~An automatic shutoff timer for the horn (variable setting 0-20 minutes) is to be installed in the control panel.~~ A flasher unit shall be installed and mounted in the control panel enclosure to operate the led flashing light attached to the unistrut. ~~The horn shall be mounted to the control panel as illustrated in the standard details.~~

L. Generator Receptacle

A generator receptacle to permit the installation of a portable emergency generator as the power source when the local utility power company power supply is lost shall be installed on the outside of the control panel as indicated on the standard details. It shall be directly connected to the emergency circuit breaker inside the control panel. The emergency and main circuit breakers shall have a mechanical interlink between them which shall allow only one source to supply power to the control panel at any given period of time. The generator receptacles shall be:

Power Supply	Required Receptacle
0-100 Amp, 230 Volt	Russell Stoll JRSB1044FR
100-200 Amp, 230 Volt	Russell Stoll JRSB2044FR
0-200 Amp, 460 Volt	Russell Stoll JRSB2034HR

M. Seal Leak Moisture Detector

Provide for each pump a moisture sensing sensor which will detect when moisture has penetrated the seal chamber. The moisture seal detector shall be connected to the County RTU system to notify lift station maintenance personnel when a seal has allowed moisture to enter the oil chamber of the pump. An indicating lamp is to be mounted in the control panel as illustrated in the standard details to also signal the seal failure.

N. Telemetry Control Unit

The remote terminal/pump control unit shall be a complete TAC Pack TCU system as manufactured by Data Flow Systems, Inc. The unit is to be a fully programmable, dual function device. It shall be used to monitor and control SCADA equipment and it shall have all the necessary hardware and software to control three pump motor starters. Its operation is based on level inputs from a minimum of four float ball switches in the ~~wetwell~~wet well. It shall have the ability to control pump alternation, activate and deactivate remote and local alarms, and communicate with the HT3 SCADA System. It shall be equipped with RTU surge protection and a transient filter shield. The unit shall have an uninterruptible power source and contain all the components and be electrically connected as indicated in the standard details. It shall be equipped with an antenna tower with supporting mast ~~(to be mounted on an existing mast)~~ and coaxial cable that is required by the manufacturer for that particular system. The battery backup will be contained with the TCU in its own enclosure. The installation shall include the required FCC licensing. The antenna and mast shall be rated for 150 MPH winds. Tower heights above 20 feet must be Rohn RG-45 series.

Pump stations that re-pump sewage flows (directly or indirectly) from other pump stations will also require an Analog Monitor Module to receive input from the force main pressure transducer and flow meter.

Telemetry control and remote terminal/pump control units are not required for privately owned and maintained pump stations.

O. Grounding

Install a 5/8" x 10' copper-clad ground rod for each electrical service. Connect to the ground rod ~~with a ground clamp and run~~ a #6 bare copper wire to connect with the electrical panel grounding bar. Provide another, separate ground rod, tower clamp, ~~Alpha Delta UCGC ground clamp for PolyPhaser,~~ and #6 bare copper wire to connect directly to the antenna tower~~,~~ ~~and~~ control cabinet/TCU cabinet, polyphaser, and ground. The ground rods and #6 bare copper wires shall be connected by a exothermic weld (cad weld).

P. Site Lighting

A minimum 6000 lumens LED shall be mounted on the system tower for illumination of the pump station area. The manually operated light shall be ~~a Regent Model EQ300M1 or equal,~~ mounted on ¾-inch ~~galvanized~~ aluminum rigid conduit connected to the RTU tower using 90 degree korns clamps.

3.01 GRINDER PUMP (LIFT) STATIONS

A. Grinder pumps shall be used where the required discharge rate is low and the discharge pipe is required to be smaller than 4-inch diameter. Grinder pumping stations shall be constructed essentially to the same standards as the larger standard pumping stations, with full plastic liners, dual pumps with guide rails, control panels, RTUs, antennas and masts, etc., but sized smaller to accommodate the lesser capacity. Wet well diameters may be smaller than 6 feet, but shall be no smaller than 4 feet. Riser pipes shall be no smaller than 1.25 inches diameter, and force mains shall be no smaller than 2 inches diameter. Ball check valves shall not be used.

B. Grinder pumps will not be required to pass a 3-inch solid, but shall rather be capable of grinding all materials normally found in domestic raw wastewater into a pumpable slurry. The grinder cutters shall be made of 440C stainless steel hardened to Rockwell 60C. Motors shall be 230 volt, 3 phase, 60 hertz, 3450 or 1750 RPM speed, and shall otherwise meet the same requirements as for the larger standard sewage pump motors. Minimum hatch cover sizes for grinder pump station ~~wetwell~~wet wells shall be 30 x 36 inches.

C. There shall be an approved shut-off valve (tapping gate valve) installed at the connection of a grinder pump station pipeline to a County force main, and where the grinder pump station is maintained by a private entity, there shall be another approved shut-off valve (gate valve) installed at the point where the grinder pump pipeline enters the public right-of-way or public utility easement. The force main shall be at least 18 inches below the top slab within the valve vault. A 90 degree bend, which is turned down, shall be installed 18 inches outside of the valve vault to lower the force main to obtain a minimum 3 feet of cover.

~~Wetwell~~Wet wells and valve vaults for grinder lift stations may be fiberglass or HDPE plastic. If fiberglass, the resins used shall be a commercial grade unsaturated polyester or vinyl ester resin. The reinforcing materials shall be commercial Grade "E" type glass in the form of continuous roving and chop roving, and shall have a coupling agent that will provide a

suitable bond between the glass reinforcement and the resin. The inner surface exposed to the chemical environment shall be a resin-rich layer of 0.010 to 0.020 inches thick. The inner surface layer exposed to the corrosive environment shall be followed with a minimum of two passes of chopped roving of minimum length 0.5 inch (13 mm) to maximum length of 2.0 inches (50.8 mm) and shall be applied uniformly to an equivalent weight of 3 oz/ft2. Each pass of chopped roving shall be well-rolled prior to the application of additional reinforcement. The combined thickness of the inner surface and interior layer shall not be less than 0.10 inch (2.5 mm). The interior surface shall be free of crazing, delamination, blisters larger than 0.5-inch in diameter and wrinkles of 0.125-inch or greater in depth. Surface pits may be permitted if they are less than 0.75-inch in diameter and less than 0.0625-inch deep. Voids that may not be broken with finger pressure and that are entirely below the resin surface shall be permitted if they are less than 0.5-inch in diameter and less than 0.0625-inch thick. After inner layer has been applied, the ~~wetwell~~wet well and valve vault wall shall be constructed with chop and continuous strand filament wound manufacturing process which insures continuous reinforcement and uniform strength and composition. ~~Wetwell~~Wet well and valve vaults may require resin fiber-reinforced bottoms.

~~Wetwell~~Wet well bottom shall have a minimum 3-inch anti-flotation ring. ~~Wetwell~~Wet well and valve vault bottom shall be designed to resist all pressures induced by water, soil and wheel loads with a maximum deflection of 1/4-inch.

No hardware shall penetrate the ~~wetwell~~wet well walls. The ~~wetwell~~wet well wall shall include built / molded in channel supports for every 8 feet of vertical discharge piping for mounting pipe support braces and for mounting both guide rails and hooks to hang float balls, pump lifting chains, etc. at the top of the wet well. All pipe openings shall have resilient pipe to ~~wetwell~~wet well seals.

The 1:1 bottom fillet may be molded or formed fiberglass or plastic or concrete. Concrete also may be used on the top of anti-flotation ring and as required to resist buoyancy. The ~~wetwell~~wet well and valve shall resist flotation with ground water level assumed to be at finished grade. The Engineer of Record shall submit flotation calculations to Manatee County when submitting Construction Drawing approval.

All fiberglass and plastic wet wells and valve vaults located such that a vehicle may run over it shall have a minimum dynamic-load rating of 16,000 lbs. when tested in accordance with ASTM D3753. To establish this rating, the complete wet well and valve vault shall not leak, crack, or suffer other damage when load tested to 40,000 lbs. and shall not deflect vertically downward more than 0.25 in. at the point of load application when loaded to 24,000 lbs. Thickness of fiberglass and plastic wet wells and valve vaults shall be determined by calculations submitted when submitting construction drawings for approval. The Engineer of Record shall perform the calculations or shall submit a certification that he or she reviewed calculations prepared by others and that the aforementioned requirements have been met.

The ~~wetwell~~wet well cylinder shall have the minimum pipe-stiffness values shown in table below when tested in accordance with ASTM D3753 Table 1.

~~WETWELL~~WET WELL LENGTH (FT.)	PIPE-STIFFNESS F/AY, [PSI (k Pa)]
3 - 6.5	0.72 (4.96)
7 - 12.5	1.26 (8.69)
13 - 20.5	2.01 (13.86)
21 - 25.5	3.02 (20.82)
26 - 35	5.24 (36.13)

The exterior surface shall be relatively smooth with no sharp projections, free of blisters larger than 0.5-inch in diameter, delamination or fiber show.

Each wet well and valve vault shall be designed and built to meet all required ASTM D3753 designations for dimensional requirements, hardness, chemical resistance, and workmanship. Test records shall be provided to the ~~Owner/Engineer of Record and to the~~ County ~~Inspector~~.

The Contractor shall set sections vertical and in true alignment. The finished wet well and valve vault shall not be out of plumb by more than 3/8-inch per 10 feet of height.

Each ~~wetwell~~wet well and valve vault shall be marked on the inside and outside with the following information: Manufacturer's name or trademark, factory location, serial or model number and total length.

4.01 WATER SERVICE

All pump stations shall be equipped with a 3/4-inch ~~lock shield and loose key~~ water service (hose bib) ~~adjacent to the valve vault~~. Each water service shall be equipped with a 5/8-inch water meter, a reduced-pressure principle backflow preventer (Wilkins 975XL2, Apollo RPLF4A, ~~Watts Model 909~~ or Equal) and a 3/4-inch brass hose bib. The water meter and backflow prevention assembly ~~preventer~~ shall be located within two feet of the pump station easement (or property) line. All water meters shall be obtained from the Manatee County Water Meter Department. Reclaimed water shall be used where available.

5.01 PERMITS

The Contractor shall be responsible for obtaining and shall pay for any permits and/or inspections required.

6.01 SHOP DRAWINGS AND INSPECTIONS

When calling for inspection, the Contractor shall have these approved shop drawings available on-site for review by the inspectors. The Contractor shall also deliver to the Lift Station Section inspector, the pump manufacturer's technical manual with the model number, serial number, and certified pump curve, for each pump prior to acceptance by the County for maintenance.

7.01 EASEMENTS

An easement for ingress and egress to the lift station and an easement for the lift station must be granted and recorded before the lift station can be accepted by the County for operation and maintenance.

8.01 SITING

A. The siting of all pump station facilities shall be subject to review and approval by Manatee County. All pump stations shall be located on a separate parcel of land or within a utility easement in common open space. The station shall be properly sited with due consideration of the neighborhood, surrounding site features, landscaping, aesthetics, safety and security. The station and associated landscaping shall not be sited on a right-of-way, private road, median, front yard of a residence, or within a visibility triangle. The pump station ~~wetwell~~wet

well, valve vault, control panel, and telemetry antenna shall not be sited within 20 feet of overhead power lines.

B. Each pump station site shall have a vehicular access drive paved with a concrete ~~or asphalt~~ surface course over a base course. The drive shall be designed to allow a service truck to park off of the right-of-way or roadway easement and to also allow the service truck to back up to the wet well such that the wet well is directly to the rear of the truck or adjacent to the side of the truck. The pump station control panel, telemetry antenna and hose bib shall not be located between the vehicular access driveway and the ~~wetwell~~wet well, valve assembly, and/or valve vault.

C. There shall be at least a 20-foot easement in all directions from the pump station site equipment. There shall be no obstructions within the easement such as buildings, walls, fences, etc., other than those that are part of the pump station and identified in these standards. A minimum setback of 5 ft shall be provided between pump station structures/equipment and the security fence. Pump station easement shall extend a minimum of 15 ft beyond all four sides of the security fence. If the pump station is adjacent to the street's right-of way, the pump station easement shall extend to the ROW line. The lift station site shall be made accessible with a minimum 30 ft wide corridor/easement.

D. Surface stormwater flow shall be directed around the pump station site. The site shall be graded to provide sheet flow of site runoff away from the equipment and direct it to a suitable swale or drainage outfall. The construction drawings shall include a pump station site plan with a grading plan and landscaping plan.

9.01 FLOODING

Wastewater pumping station structures and electrical and mechanical equipment shall be fully protected from physical damage from flood water intrusion by the 100-year flood. Wastewater pumping stations shall remain fully operational and accessible during the 25-year flood. Regulations of state and federal agencies regarding obstructions of the pumping station site by flood waters shall be observed during the design of the development.

10.01 ENTRANCE HATCH ELEVATIONS

The ~~wetwell~~wet well and valve vault top and entrance hatches shall be set at least 4 inches above the 100-year flood plain elevation, or 8 inches above the 25-year flood plain elevation, or 6 inches above the surrounding grade, or 12 inches above the adjacent roadway crown elevation, whichever is highest. Where this is not practical, deviation from the above must be approved by the County on a case-by-case basis.

11.01 ACCESSIBILITY AND SECURITY

~~All County owned and maintained~~The pumping station~~s~~ shall be readily accessible by maintenance vehicles during all weather conditions~~ and during all stages of development construction~~. A fully functional paved travelway shall be provided to the lift station driveway. The facility shall be located off the traffic way of streets and alleys.~~ Security fencing and access hatches with locks shall be provided.~~

All hatches, electrical panel and irrigation panel doors shall be provided with lockable hasps or staples.

Security fences with lockable gates shall be provided for all lift stations that are owned and maintained by Manatee County.

Lift stations shall have a 6-foot high vinyl coated chain link security fence with privacy decorative slatting (color matched). Chain link security fencing shall be #9 gauge core, galvanized with vinyl coating, with 1 5/8 inch top rails, 2 3/8 inch Schedule 40 line posts, 2 1/2 inch Schedule 40 corner posts and 3 1/2 inch Schedule 40 gate posts for swing gates. Gate posts and track line posts shall be 4 inch Schedule 40 for cantilever slide gates. Maximum line posts spacing shall be equally spaced, not to exceed 8 feet. ~~Lift stations shall have a minimum 6 foot high concrete aggregate, stucco, brick, stone, split face concrete masonry, or chain link security fence.~~

For private lift stations, the Engineer of Record shall evaluate the location of the proposed lift station and determine whether a security fence is necessary.

12.01 FORCE MAIN ~~PRESSURE TRANSMITTER AND~~ FLOW METER

Lift stations that re-pump sewage flows (directly or indirectly) from other lift stations shall be equipped with a submersible electromagnetic flow meter. The flow meter shall be mounted on an above-ground force main. The flow meter shall be a McCrometer Ultra Mag Model UM06 or an approved equal. The meters, gauges and all connections and wiring shall be rated fully submersible. The flow meter shall transmit 4-20 mA signals to the telemetry system via the Analog Monitor Module mounted inside the control panel. The signal cables shall be run through 1-inch PVC conduit from the meter to the control panel. The meter display unit shall be weather-proof and mounted on an aluminum stand adjacent to the meter. ~~Lift stations that re-pump sewage flows (directly or indirectly) from other lift stations shall be equipped with an ultrasonic flow meter and force main pressure transducer. The flow meter shall be mounted on the force main in a water tight vault downstream from the valve vault. The flow meter shall be GE Panametrics Model AT868 Aqua Tans (for DIP or plastic pipe), or Eastech Badger Vantage Model 4400 (for plastic pipe materials only), or an approved equal. The flow meter sensors mounted on the force main shall be water proof. The meters, gauges and all connections and wiring shall be rated fully submersible. The transmitter shall be mounted next to the electrical control panel in a weather proof enclosure. The force main pressure transmitter shall be Ashcroft model T2-7-M02-42-H1-100#. The pressure transmitter shall be factory assembled with an Ashcroft model 25-312SS-02T-CD diaphragm seal filled with glycerin. The force main pressure transmitter shall be threaded into a cast billet on the outside curve of one of the 90's inside the vault. The flow meter and the force main pressure transducer shall transmit 4-20 mA signals to the telemetry system via the Analog Monitor Module mounted inside the control panel. The signal cables shall be run through 1-inch PVC conduit from the vault to the control panel.~~

13.01 LANDSCAPING & IRRIGATION

A. Landscape trees and shrubs.

The pump station site shall have shrubs planted around the perimeter of the pump station security fence in a hedge-like placement. Shrubs shall have a minimum spacing of 3 feet between the centers of the shrub's base stem. For private pump stations that are located in nonresidential areas, shrubs are optional for the sides that are not adjacent to thoroughfare roads, nonthoroughfare roads, and residential areas. For pump

stations that are located adjacent to thoroughfare roads and non-thoroughfare roads, a minimum of two small understory trees or palm trees shall be planted between the pump station security fence and the right of way line. For pump stations within residential areas or located adjacent to residential areas, a minimum of two additional understory trees or palm trees; for a total of at least four understory trees or palm trees shall be planted around the pump station (these landscaping requirements are not applicable to pump stations that only serve one single family residence.) A minimum setback of 5 feet shall be provided between the shrub's base stem and the security fence to provide an access way for service personnel. A minimum setback of 10 feet shall be provided between the trunk of understory trees/palm trees and the security fence.

Understory trees shall not have a mature height exceeding 30 feet. Small understory trees, palm trees and shrubs shall not have evasive roots. The minimum height of understory trees shall be six (6') feet at time of placement. The minimum height of palm trees shall be fifteen (15') feet at time of placement. The minimum height of shrubs shall be two (2') feet at time of placement. Shrubs shall have three gallon root balls. Shrub growth habits shall be upright, globose, or columnar. Shrub growth habits shall not be spreading or broad spreading. The understory trees and palm trees shall be planted to accent the shrub placement. Tops of root balls of plants shall be set at or slightly above existing grade. All plant material to be Florida Grade #1 or better, as defined in "Grades and Standards for Nursery Plants," State of Florida Dept. of Agriculture. Plants shall be sound, healthy, vigorous, and free from plant diseases, insects, pests, or their eggs and shall have healthy normal root systems. Plants shall be nursery grown stock, freshly dug. No heeled in, cold storage, or collected stock shall be accepted. Ground covers shall have sturdy fibrous root systems. Staking and bracing shall be done on all trees using Arbor tape and the Duckbill anchor system, in accordance with sound nursery practices.

The shrubs, understory trees and palm trees shall be of the drought tolerant, low maintenance varieties. Plant selection shall be based on soil water retention as well as soil pH.

Examples of acceptable vegetation are as follows:

	SOIL CONDITIONS WHERE PLANT WILL GROW		pH RANGE	
PLANT NAME	Damp to poorly drained soils w/ low percolation	Well drained sands w/ high percolation	Plant tolerates acidic & alkaline soils	Plant tolerates acidic soils only
UNDERSTORY TREES (Mature height not exceeding 30 feet)				
Little Gem Magnolia (Magnolia grandiflora)	X			X
Southern Wax Myrtle (Myrica cerifera)	X	X	X	
Peregrina (Jatropha intergerrima)		X	X	
Bottle Brush Tree (Callistemon citrinus)		X		X
Crape Myrtle Tree (Lagerstroemia Indica)		X		X

Feijoa (Feijoa sellowiana)		X	X	
PALMS				
Cabbage Palms (Sabal palmetto)	X	X	X	
Pindo Palms (Butia capitata)		X	X	
Dwarf Royal (aka Christmas) Palm (Veitchia merrillii)		X	X	
SHRUBS & BUSHES				
Cocoplum (Chrysobalanus icaco)		X	X	
Pipestem (Agarista Populafollia)	X	X	X	
Sweet Viburnum (Viburnum odoratisimum)		X	X	
Yew podocarpus (Podocarpus macrophyllus)		X	X	

The following plant species shall not be planted at the lift station site:
Melaleuca quinquenervia (commonly known as Punk tree, Malaleuca); Schinus terebinthefolius (commonly known as Brazilian Pepper); Casuarina species (commonly known as Australian Pine); Rhodomyrtus tomentosa (commonly known as Downy Rose Myrtle); Mimosa pigra (commonly known as the Catclaw Mimosa); Dalbergia sissoo (commonly known as the Indian Rosewood); and Cupaniopsis anacardioides (commonly known as the Carrotwood).

B. Ground cover.

There shall be no vegetation within the lift station fencing. Site shall include a polypropylene weed barrier fabric that is covered with a minimum of 2-inches of washed shell, or rock within lift station fencing. Landscaping stones shall be inert and nonleaching. Crushed lime rock shall not be acceptable. Site shall include a polypropylene weed barrier fabric that is covered with 3 to 4-inches of shredded wood-type mulch that is located under the shrubs and up to the outside of the security fence. Polypropylene weed barrier fabric that is covered with 3 to 4-inches of shredded wood-type mulch shall be located under the trees for a minimum distance of 3 feet from the tree. Bahia, St. Augustine or Floritam sod or shredded wood-type mulch with a polypropylene weed barrier fabric shall be extended from the shrubs to the lift station easement line.

C. Irrigation.

An irrigation system shall be connected to a non-potable water source. A weather-tight time clock with built-in transformer, minimum of four zones (Rainbird ESP-4M, Toro CC-M-9, or equal) and a rain sensor (Mini-Clik, or equal) shall be furnished and installed. The irrigation controller shall be in a lockable control panel and attached with stainless steel two piece pipe clamps or stainless steel U-bolts to two vertical 3 inch diameter stainless steel, schedule 40 pipes or equal pipe support. The pipe clamp or U-bolt ends shall be covered with plastic caps to prevent injury to personnel. The 3 inch vertical pipe shall have plastic end caps or stainless steel end caps at the top and shall be anchored in concrete. The irrigation system control panel recommended location is outside of the fence and behind the shrubs. The Contractor shall furnish the County a padlock with a set of two keys for the

irrigation control panel. The number of zones shall be based on the proposed site, planting configuration, watering distribution, irrigation system demand, and type of vegetation to be irrigated. The irrigation system shall be installed to irrigate the trees, shrubs and grassed areas; and designed to provide three-fourths (3/4") to one (1") inch of water per week and be in conformance with irrigation restrictions established by the Southwest Florida Water Management District (not restricted if using reclaimed water). The irrigation system shall adhere to the requirements of the Manatee County Land Development Code and to the "Standards and Specifications for Turf and Landscape Irrigation Systems", latest edition, as published by the Florida Irrigation Society, Inc. A permanent sprinkler system with distribution lines underground with mist and/or bubbler nozzles, as appropriate, above the ground are acceptable. A micro-irrigation system located within the planting beds of shrubs and trees is acceptable for that type of installation. In each accent, isolated or separate tree planting bed, a tree bubbler (Toro 514-20 or equal), shall be installed at each tree. In addition, a four (4') foot section of flexible PVC shall be provided for the tree bubbler at each tree. Drip line hoses shall have built-in emitters (Toro DL2000 or equal).

D. Radio signal interference.

Landscape buffer plantings are to be field adjusted in coordination with the siting of the lift station's radio antenna to eliminate signal interference. The antenna for the existing or proposed radio telemetry unit at the lift station requires direct line-of-sight signaling capability to the Utilities Department office that will receive the signal. There shall be an unobstructed horizontal angle of fifteen (15°) degrees from the antenna mast (7 1/2 degrees on both sides of the direct line-of-sight azimuth). No tree shall be planted within the designated unobstructed angle for a twenty (20') foot horizontal distance measured from the mast.

14.01 BACK-UP DIESEL PUMPS OR EMERGENCY GENERATOR SET

Back-up Diesel Pumps: See Section 11215
Emergency Generators: See Section 16231

END OF SECTION

DIVISION 9 -

PAINTING

SECTION 09900 PAINTING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all labor, tools, materials, equipment, scaffolding or other structures and incidentals necessary to complete this Contract in its entirety.

B. The work includes painting and finishing of all new interior and exterior exposed items above and below grade and surfaces, such as structural steel, miscellaneous metals, fittings, valves, equipment and all other work obviously required to be painted unless otherwise specified herein or on the Drawings. The omission of minor items in the Schedule of Work shall not relieve the Contractor of his obligation to include such items where they come within the general intent of the Specification as stated herein.

C. The finish paint color for the potable water and dry force main piping systems to be installed on the new bridge shall match the new bridge color and be selected by the Owner. During Shop Drawing review, the Contractor shall submit proposed color chips for Owner approval or selection.

D. The following items shall not be painted:

1. Any code-requiring labels, such as Underwriter's Laboratories and Factory Mutual, or any equipment identification, performance rating, name or nomenclature plates.
2. Any moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts, unless otherwise indicated.
3. Aluminum handrails (except where in contact with concrete) walkways, windows, louvers and grating unless otherwise specified herein.
4. Signs and nameplates.
5. Finish hardware.
6. Chain link fence.
7. Piping buried in the ground or embedded in concrete.
8. Concealed surfaces of pipe or crawl space.
9. Nonferrous metals, unless specifically noted otherwise.
10. Electrical switchgear and motor control centers.
11. Stainless steel angles, tubes, pipe, etc.
12. Products with polished chrome, aluminum, nickel or stainless steel finish.
13. Plastic switch plates and receptacle plates.
14. Flexible couplings, lubricated bearing surfaces, insulation and metal and plastic pipe interior.
15. Sprinkler heads.
16. Lifting chain on cranes and hoists
17. Electrical cable, festooned conductor system, cables, collector pole brackets, etc.

E. All work shall be done in strict accordance with this Specification, the Design Drawings and the painting package, including manufacturer's printed instructions.

F. The Contractor will obtain, at its own expense, all permits, licenses and inspections and shall comply with all laws, codes, ordinances, rules and regulations promulgated by authorities having jurisdiction which may bear on the Work. This compliance will include

Federal Public Law 91-596 more commonly known as the "Occupational Safety and Health Act of 1970".

1.02 DEFINITIONS

A. Field Painting is the painting of new or rebuilt items at the job site. Field painting shall be the responsibility of the Contractor.

B. Shop Painting is the painting of new or rebuilt items in the shop prior to delivery to the jobsite.

C. Abbreviations The abbreviations and definitions listed below, when used in this specification, shall have the following meanings:

1. County – The term County is used to refer to either the County or an appointed County's representative such as an engineer, architect, etc.
2. SSPC - The Society for Protective Coatings
3. Exterior - Outside, exposed to weather
4. Interior Dry - Inside, concealed or protected from weather
5. Interior Wet - Inside, subject to immersion services
6. ASTM - American Society of Test Materials
7. NACE - National Association of Corrosion Engineers
8. NSF - National Sanitation Foundation
9. AWWA - American Water Works Association
10. ICRI - International Concrete Restoration Institute

D. Dry Film Thickness shall be in Mils

1.03 RESOLUTION OF CONFLICTS

A. It shall be the responsibility of the Contractor to arrange a meeting prior to the start of any coating ~~applocations~~applications between the Contractor, the Coating Manufacturer, whose products are to be used, and the County. All aspects of surface preparation, application and coating systems as covered by this Specification will be reviewed at this meeting.

B. Clarification shall be requested promptly from the County when instructions are lacking, conflicts occur in the Specifications, or the procedure seems improper or inappropriate for any reason.

C. Copies of all manufacturer's instructions and recommendations shall be furnished to the County by the Painting Contractor.

D. It shall be the responsibility of the Coating Manufacturer to have their factory representative meet in person with the Contractor and County a minimum of three times during the job as a consultant on surface preparation, mil thickness of coating and proper application of coating ~~before and during the job as a consultant on proper preparation and application of the coating materials~~ unless a meeting is determined to be unnecessary by the County.

1.04 SUBMITTALS

A. Contractor shall submit catalog data and cut sheets for the painting system being used if not the TNEMEC materials specified.

B. Samples as detailed in 3.01 B shall be submitted regardless of system being used, showing

each color to be used.

C. Hazardous Material Disposal documentation shall be submitted if applicable.

D. The finish paint color for the potable water and dry force main piping systems to be installed on the new bridge shall match the new bridge color and be selected by the Owner. During Shop Drawing review, the Contractor shall submit proposed color chips for Owner approval or selection.

PART 2 PRODUCTS

2.01 EQUIPMENT

A. Effective oil and water separators shall be used in all compressed air lines serving spray painting and sandblasting operations to remove oil or moisture from the air before it is used. Separators shall be placed as far as practicable from the compressor.

B. All equipment for application of the paint and the completion of the work shall be furnished by the Contractor in first-class condition and shall comply with recommendations of the paint manufacturer.

C. Contractor will make available to the County a "Nordson-Mikrotest" or "Positest" dry film thickness gauge for ferrous metal and an OG232 "Tooke" gauge or equal for non-ferrous and cementitious surface, to be used to inspect coatings by the County and Contractor. The gauges may be used by the Contractor and returned each day to the County. County will return gauges to Contractor at completion of job.

2.02 MATERIALS

A. All materials specified herein are manufactured by the TNEMEC Company, Inc., North Kansas City, Missouri. These products are specified to establish standards of quality and are approved for use on this Project.

B. Equivalent materials of other manufacturers may be substituted on approval of the County. Requests for substitution shall include manufacturer's literature for each product giving the name, generic type, descriptive information and evidence of satisfactory past performance and an independent laboratory certification that their product meets the performance criteria of the specified materials.

C. Abrasion - Fed. Test Method Std. No. 141, Method 6192, CS-17 Wheel, 1,000 grams load.

D. Adhesion - Elcometer Adhesion Tester.

E. Exterior Exposure - Exposed at 45 degrees facing the ocean (South Florida Marine Exposure)

F. Hardness - ASTM D3363-74

G. Humidity - ASTM D2247-68

H. Salt Spray (Fog) - ASTM B117-73

I. Standard practice for Operating the Severe Wastewater Analysis Testing Apparatus ASTM G210-13

~~C~~J. ~~Requests for substitution shall be submitted by the coating manufacturer a minimum of 10 days prior to the project bid date.~~

~~D.~~ Substitutions which decrease the total film thickness, change the generic type of coating, or fail to meet the performance criteria of the specified materials shall not be approved. Prime and finish coats of all surfaces shall be furnished by the same manufacturer.

~~E~~K. All coatings to be shop applied must meet the requirements for volatile organic compounds (VOC) of not more than 3.5 lbs/gallon after thinning.

~~F~~L. Colors, where not specified, shall be as selected by the County or their Representative.

~~G.~~M All coatings in contact with potable water need to be NSF Certified in accordance with ANSI/NSF Standard 61.

~~H~~N. All above ground potable water mains and appurtenances shall be painted Safety Blue ~~(Tnemec 11SF)~~.

~~2.03 REFERENCES~~

~~A. This section contains references to the governing standards and documents listed below. They are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed documents, the more stringent of the requirements shall prevail.~~

~~A. Unless otherwise specified, references to documents shall mean the documents in effect at the time of receipt of Bids. If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, whether or not the document has been superseded by a version with a later date, discontinued, or replaced.~~

~~B. Referenced publications found within this specification shall be the latest revision unless otherwise specified; and applicable parts of the referenced publications shall become a part of this specification as if fully included.~~

~~C. ASTM International (ASTM):~~

~~1. ASTM B117 - Salt Spray (Fog)~~
~~2. ASTM C140 - Water Absorption (Applied to Cast Mortar Cubes)~~
~~3. ASTM C307 - Tensile Strength, Elongation, Modulus of Elasticity~~
~~4. ASTM C531 - Thermal Expansion~~
~~5. ASTM C579 - Compressive Strength~~
~~6. ASTM C580 - Flexural Strength and Modulus of Elasticity~~
~~7. ASTM C67 - Water Absorption (Applied to Fire Clay Brick)~~
~~8. ASTM C793 - Accelerated Weathering~~
~~9. ASTM C97 - Water Absorption (Applied to Ohio Sandstone)~~
~~10. ASTM D1014 - Exterior Exposure~~

~~11. ASTM D2047 - Coefficient of Friction~~
~~12. ASTM D2247 - Humidity~~
~~13. ASTM D2370 - Tensile Strength, Elongation, Modulus of Elasticity~~
~~14. ASTM D2794 - Impact~~
~~15. ASTM D3273 - Fungal/Mold/Mildew Resistance~~
~~16. ASTM D4060 - Abrasion~~
~~17. ASTM D4141, Method C (EMMAQUA) - Exterior Exposure~~
~~18. ASTM D4541 - Adhesion~~
~~19. ASTM D4585 - Humidity~~
~~20. ASTM D4587 - QUV Exposure~~
~~21. ASTM D522 - Flexibility and Elongation~~
~~22. ASTM D5590 - Fungal/Mold/Mildew/Algal Resistance~~
~~23. ASTM D5894 - Cyclic Salt Fog/UV Exposure~~
~~24. ASTM D624 - Tear Strength~~
~~25. ASTM D638 - Tensile Strength, Elongation, Modulus of Elasticity~~
~~26. ASTM D648 - Deflection Temperature~~
~~27. ASTM D6695 - Xenon Arc Weathering~~
~~28. ASTM D695 - Compressive Strength~~
~~29. ASTM D7234 - Adhesion~~
~~30. ASTM D790 - Flexural Strength and Modulus of Elasticity~~
~~31. ASTM D870 - Immersion~~
~~32. ASTM G85 - Prohesion~~

~~D. NACE International (NACE):~~

~~1. NACE TM-01-74~~

~~E. Federal Specification (FED):~~

~~1. FED TT-C-555B - Wind Driven Rain~~

~~F. Military and Government Specs & Standards:~~

~~1. MIL D3134 - Impact~~

~~G. British Standard:~~

~~1. BS EN 598: 2007+A1: 2009 - Rocking Abrasion~~

~~H. American Association of State Highway and Transportation Officials~~

~~1. AASHTO T-259 - Chloride Ion Penetration~~

PART 3 EXECUTION

3.01 INSPECTION OF SURFACES

A. Before application of the prime coat and each succeeding coat, all surfaces to be coated shall be subject to inspection by the County. Any defects or deficiencies shall be corrected by the Contractor before application of any subsequent coating.

B. Samples of surface preparation and of painting systems shall be furnished by the Contractor

to be used as a standard throughout the job, unless omitted by the County.

C. When any appreciable time has elapsed between coatings, previously coated areas shall be carefully inspected by the County, and where, in his opinion, surfaces are damaged or contaminated, they shall be cleaned and recoated at the Contractor's expense. Recoating times of manufacturer's printed instructions shall be adhered to.~~The Contractor shall follow the Manufacturer's latest printed recommended minimum and maximum recoat times. If the maximum recoat time has been exceeded, the Contractor shall follow the Manufacturer's latest printed instructions.~~

D. Coating thickness shall be determined by the use of a properly calibrated "Nordson-Mikrotest" or "Positest" Coating Thickness Gauge (or equal) for ferrous or an OG232 "Tooke" Paint Inspection gauge (or equal) for non-ferrous and cementitious surfaces. Please note that use of the "Tooke" gauge is classified as a destructive test.~~metal. Please note that a "Tooke" gauge may be used on cementitious surfaces, and that use of the "Tooke" gauge is classified as a destructive test.~~

~~E. Before performing any destructive tests on a newly applied coating system, the Owner and Contractor shall determine which of them is responsible for the cost of repairing the damaged coatings.~~

3.02 SURFACE PREPARATION

The surface shall be cleaned as specified for the paint system being used. All cleaning shall be as outlined in the Society for Protective Coatings (SSPC) Surface Preparation Specification, And the International Concrete Repair Institute (ICRI) unless otherwise noted. If surfaces are subject to contamination, other than mill scale or normal atmospheric rusting, the surfaces shall be pressure washed, and acid or caustic pH residues neutralized, in addition to the specified surface preparation.

3.~~02~~03 STANDARDS FOR SURFACE PREPARATION

A. SSPC-SP1: Chemical and/or Solvent Cleaning: Remove all grease, oil, salt, acid, alkali, dirt, dust, wax, fat, foreign matter and contaminates, etc. by one of the following methods: steam cleaning, alkaline cleaning, or volatile solvent cleaning.

B. SSPC-SP2: Hand Tool Cleaning: Removal of loose rust, loose mill scale and loose paint to a clean sound substrate by hand chipping, scraping, sanding and wire brushing.

C. SSPC-SP3: Power Tool Cleaning: Removal of loose rust, loose mill scale and loose paint to a clean sound substrate by power tool chipping, descaling, sanding, wire brushing and grinding.

D. Flame Cleaning: Dehydrating and removal of rust, loose mill scale and some light mill scale by use of flame, followed by wire brushing .

~~D.~~E. SSPC-SP5/NACE No.1: White Metal Blast Cleaning: Complete removal of all mill scale, rust, rust scale, previous coating, etc., leaving the surface a uniform gray-white color.

~~E.~~F. SSPC-SP6/NACE No.3: Commercial Blast Cleaning: Complete removal of all dirt, rust scale, mill scale, foreign matter and previous coating, etc., leaving only shadows and/or streaks caused by rust stain and mill scale oxides. At least 66% of each square inch of surface area is to be free of all visible residues, except slight discoloration.

~~F.~~G. SSPC-SP7/NACE No.4: Brush-Off Blast Cleaning: Removal of rust scale, loose mill scale, loose rust and loose coatings, leaving tightly-bonded mill scale, rust and previous coatings. On concrete surfaces, brush-off blast cleaning shall remove all laitance, form oils and solid contaminates. Blasting should be performed sufficiently close to the surface so as to open up surface voids, bugholes, air pockets and other subsurface irregularities, but so as not to expose underlying aggregate.

H. Pickling: Complete removal of rust and mill scale by acid pickling, duplex pickling or electrolytic pickling (may reduce the resistance of the surface to corrosion, if not to be primed immediately).

~~G.~~I. SSPC-SP10/NACE No.2: Near-White Blast Cleaning: Removal of all rust scale, mill scale, previous coating, etc., leaving only light stains from rust, mill scale and small specks of previous coating. At least 95% of each square inch of surface area is to be free of all visible residues and the remainder shall be limited to slight discoloration.

~~H.~~J. SSPC-SP11: Power Tool Cleaning to Bare Metal: Complete removal of rust, rust scale, mill scale, foreign matter and previous coatings, etc., to a standard as specified on a Commercial Grade Blast Cleaning (SSPC-SP-6, NACE-3) by means of power tools that will provide the proper degree of cleaning and surface profile.

K. Surface Preparation of Concrete (SSPC-SP13)

~~I. SSPC-SP13/NACE No.6: Surface Preparation of Concrete: Provides requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems.~~

~~a. International Concrete Restoration Institute (ICRI):~~

~~1. ICRI 320.1R - Exposed Reinforcing bar (Rebar) Repair~~
~~1. ICRI-CSP 1 - Concrete Surface Profile 1~~
~~2. ICRI-CSP 2 - Concrete Surface Profile 2~~
~~3. ICRI-CSP 3 - Concrete Surface Profile 3~~
~~4. ICRI-CSP 4 - Concrete Surface Profile 4~~
~~5. ICRI-CSP 5 - Concrete Surface Profile 5~~
~~6. ICRI-CSP 6 - Concrete Surface Profile 6~~

~~J. SSPC-SP14/NACE No.8: Industrial Blast Cleaning: An industrial blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dust, and dirt. Traces of tightly adherent mill scale, rust, and coating residues are permitted to remain on 10% of each unit area of the surface if they are evenly distributed.~~

~~K. SSPC-SP15: Commercial Grade Power Tool Cleaning: A commercial grade power tool cleaned steel surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, rust, coating, oxides, mill scale, corrosion products, and other foreign matter, except as noted. Random staining shall be limited to no more than 33 percent of each unit area of surface as defined.~~

L. Visual standards "Pictorial Surface Preparation Standards for Painting Steel Surfaces", and the National Association of Corrosion Engineer, "Blasting Cleaning Visual Standards" TM-01-70 and TM-01-75 shall be considered as standards for proper surface preparation.

M. Oil, grease, soil, dust, etc., deposited on the surface preparation that has been completed shall be removed prior to painting according to Solvent Cleaning under this Specification.

N. Weld flux, weld spatter and excessive rust scale shall be removed by Power Tool Cleaning as per these Specifications.

O. All weld seams, sharp protrusions and edges shall be ground smooth prior to surface preparation or application of any coatings.

P. All areas requiring field welding shall be masked off prior to shop coating, unless waived by the County.

Q. All areas which require field touch-up after erection, such as welds, burnbacks, and mechanically damaged areas, shall be cleaned by thorough Power Tool as specified in these Specifications.

~~M.~~ R. Touch-up systems will be same as original specification except that approved manufacturer's organic zinc-rich shall be used in lieu of inorganic zinc where this system was originally used. Also strict adherence to manufacturer's complete touch-up recommendations shall be followed. Any questions relative to compatibility of products shall be brought to the County's attention; otherwise, Contractor assumes full responsibility.~~NAPF 500-03-04: External Pipe Surface: When viewed without magnification, the exterior surfaces shall be free of all visible dirt, dust, loose annealing oxide, rust, mold, coatings, and other foreign matter.~~

~~N. NAPF 500-03-05: Fitting Blast Clean #2: When viewed without magnification, no more than 5% staining may remain on the surface and the exterior surfaces shall be free of all visible dirt, dust, annealing oxide, rust, mold, coatings, and other foreign matter.~~

~~3.03 SURFACE PREPARATION~~

~~A. The surface shall be cleaned as specified for the paint system being used .~~

~~B. All cleaning shall be as outlined in the Society for Protective Coatings (SSPC) Surface Preparation Specification, National Association of Corrosion Engineers (NACE), and the International Concrete Repair Institute (ICRI) unless otherwise noted.~~

~~C. If surfaces are subject to contamination, other than mill scale or normal atmospheric rusting, the surfaces shall be checked for chloride contamination, pressure washed, and acid or caustic pH residues neutralized, in addition to the specified surface preparation.~~

~~D. Oil, grease, soil, dust, etc., deposited on the surface preparation that has been completed shall be removed prior to painting according to SSPC-SP1 Solvent Cleaning under this Specification.~~

~~E. Weld flux, weld spatter, and rust scale shall be removed by a minimum of SSPC-SP3 Power Tool Cleaning as per these Specifications.~~

~~F. All weld seams, sharp protrusions and edges shall be ground smooth prior to surface preparation or application of any coatings.~~

~~G. All areas requiring field welding shall be masked off prior to shop coating, unless waived~~

by the Owner.

H. All areas which require field touch-up after erection, such as welds, burnbacks, and mechanically damaged areas, shall be prepared per the Manufacturer's latest written recommendations.

I. In the event that an existing coating's max recoat window has been exceeded, all surfaces to be overcoated must be thoroughly and uniformly de-glossed and scarified before the application of additional coatings.

J. All surfaces must be clean and dry prior to the application of any coatings.

3.0404 PRETREATMENTS

When specified, the surface shall be pretreated in accordance with the specified pretreatment prior to application of the prime coat of paint.

3.0505 STORAGE

Materials shall be delivered to the job site in the original packages with seals unbroken and with legible unmutilated labels attached. Packages shall not be opened until they are inspected by the County and required for use. All painting materials shall be stored in a clean, dry, well-ventilated place, protected from sparks, flame, direct rays of the sun or from excessive heat. Paint susceptible to damage from low temperatures shall be kept in a heated storage space when necessary. All coating materials shall be stored in accordance with the Manufacturer's latest written recommendations. The Contractor is responsible for following the Manufacturer's suggested storage temperatures and conditions. The Contractor shall be solely responsible for the protection of the materials stored by himself at the job site. Empty coating cans shall be required to be neatly stacked in an area designated by the County and removed from the job site on a schedule determined by the County. County may request a notarized statement from Contractor detailing all materials used on the Project.

3.0606 PREPARATION OF MATERIALS

A. Mechanical mixers, capable of thoroughly mixing the pigment and vehicle together, shall mix the paint prior to use where required by manufacturer's instructions; thorough hand mixing will be allowed for small amounts up to one gallon. Pressure pots shall be equipped with mechanical mixers to keep the pigment in suspension, when required by manufacturer's instructions. Otherwise, intermittent hand mixing shall be done to assure that no separation occurs. All mixing shall be done in accordance with SSPC Vol. 1, Chapter 4, "Practical Aspects, Use and Application of Paints" and/or with manufacturer's recommendations.

B. Catalysts or thinners shall be as recommended by the manufacturer and shall be added or discarded strictly in accordance with the manufacturer's instruction. Thinners shall be as recommended by the manufacturer and shall be added or discarded strictly in accordance with the manufacturer's instruction. Partial kits may only be used when components are accurately measured and mixed per the Manufacturer's latest written recommendations.

3.0707 APPLICATION

A. Paint shall be applied only on thoroughly dry surfaces and during periods of favorable

weather, unless otherwise allowed by the paint manufacturer. Except as provided below, painting shall not be permitted when the atmospheric temperature is below 50 degrees ~~Foutside the limit of the manufacturer's latest written recommendations~~, or when freshly painted surfaces may be damaged by rain, fog, dust, or condensation, and/or when it can be anticipated that these conditions will prevail during the drying period.

B. No coatings shall be applied unless surface temperature is a minimum of 5 degrees above dew point; temperature must be maintained during curing.

C. See coating schedule for actual coating systems to be used on this project.

3.08 DEW POINT CALCULATION CHART

DEW POINT CALCULATION CHART

Ambient Air Temperature - Fahrenheit

Relative Humidity	20	30	40	50	60	70	80	90	100	110	120
90%	18	28	37	47	57	67	77	87	97	107	117
85%	17	26	36	45	55	65	76	84	95	104	113
80%	16	25	34	44	54	63	73	82	93	102	110
75%	15	24	33	42	52	62	71	80	91	100	108
70%	13	22	31	40	50	60	68	78	88	96	105
65%	12	20	29	38	47	57	66	76	85	93	103
60%	11	29	27	36	45	55	64	73	83	92	101
55%	9	17	25	34	43	53	61	70	80	89	98
50%	6	15	23	31	40	50	59	67	77	86	94
45%	4	13	21	29	37	47	56	64	73	82	91
40%	1	11	18	26	35	43	52	61	69	78	87
35%	-2	8	16	23	31	40	48	57	65	74	83

SURFACE TEMPERATURE AT WHICH CONDENSATION OCCURS

Dew Point

Temperature at which moisture will condense on surface. No coatings should be applied unless surface temperature is a minimum of 5 degrees~~g~~ above this point. Temperature must be maintained during curing.

Example

If air temperature is 70 ~~deg~~ degrees F and relative humidity is 65%, the dew point is 57 ~~deg~~ degrees F. No coating should be applied unless surface temperature is 62 ~~deg~~ degrees F minimum.

A. No coating shall be applied unless the relative humidity is below 85%.

B. Suitable enclosures to permit painting during inclement weather may be used if provisions are made to control atmospheric conditions artificially inside the enclosure, within limits suitable for painting throughout the painting operations.

C. Field painting in the immediate vicinity of, or on, energized electrical and rotating equipment, and equipment and/or pipes in service shall not be performed without the approval of the County.

D. Extreme care shall be exercised in the painting of all operable equipment, such as valves, electric motors, etc., so that the proper functioning of the equipment will not be affected.

E. The Contractor's scaffolding shall be erected, maintained and dismantled without damage to structures, machinery, equipment or pipe. Drop cloths shall be used where required to protect buildings and equipment. All surfaces required to be clear for visual observation shall be cleaned immediately after paint application.

F. Painting shall not be performed on insulated pipe within three (3) feet of insulation operations or on insulation whose covering and surface coat have not had time to set and dry. Painting shall not be performed on uninsulated pipe within one (1) foot of any type of connection until the connection has been made, except as directed by the County.

G. The prime coat shall be applied immediately following surface preparation and in no case later than the same working day. All paint shall be applied by brushing, paint mitt and roller, conventional spraying, or airless spraying, using equipment approved by the paint manufacturer.

H. Each coat of paint shall be recoated as per manufacturer's instructions. Paint shall be considered recoatable when an additional coat can be applied without any detrimental film irregularities such as lifting or loss of adhesion.

I. Surfaces that will be inaccessible after assembly shall receive either the full specified paint system or three shop coats of the specified primer before assembly.

~~J. Unless otherwise specified, each full coat within a coating system shall be of a different or alternating color.~~

K. Finish colors shall be in accordance with the COLOR SCHEDULE and shall be factory mixed (i.e., there shall be no tinting by the Contractor, unless authorized by the County).

K. All edges and weld seams in immersion service shall receive a "stripe coat" (applied by brush) of the 2nd coat prior to application of the full 2nd coat.

L. All open seams in the roof area of tanks shall be filled after application of the topcoat with a flexible caulking such as Sika Flex 1A.

3.09 WORKMANSHIP

A. The Contractor must show proof that all employees associated with this Project shall have been employed by the Contractor for a period not less than six (6) months.

B. Painting shall be performed by experienced painters in accordance with the recommendations of the paint manufacturer. All paint shall be uniformly applied without sags, runs, spots, or other blemishes. Work which shows carelessness, lack of skill, or is defective in the opinion of the County, shall be corrected at the expense of the Contractor.

C. The Contractor shall provide the names of at least three other projects of similar size and

scope that they have successfully completed under their current company name.

3.10 APPLICATION OF PAINT

A. By Brush and/or Rollers

1. Top quality, properly styled brushes and rollers shall be used. Rollers with a baked phenol core shall be utilized.
2. The brushing or rolling shall be done so that a smooth coat as nearly uniform in thickness as possible is obtained. Brush or roller strokes shall be made to smooth the film without leaving deep or detrimental marks.
3. Surfaces not accessible to brushes or rollers may be painted by spray, by dauber or sheepskins, and paint mitt.
4. It may require two coats to achieve the specified dry film thickness if application is by brush and roller.

B. Air, Airless or Hot Spray

1. The equipment used shall be suitable for the intended purpose, shall be capable of properly atomizing the paint to be applied and shall be equipped with suitable pressure regulators and gauges.
2. Paint shall be applied in a uniform layer, with a 50% overlap pattern. All runs and sags should be brushed out immediately or the paint shall be removed and the surface resprayed.
3. High build coatings should be applied by a cross-hatch method of spray application to ensure proper film thickness of the coating.
4. Areas inaccessible to spray shall be brushed; if also inaccessible to brush, daubs or sheepskins shall be used, as authorized by the manufacturer.
5. Special care shall be taken with thinners and paint temperatures so that paint of the correct formula reaches the receiving surface.~~Thinners shall be as recommended by the manufacturer and shall be added or discarded strictly in accordance with the manufacturer's instruction.~~
6. Nozzles, tips, etc., shall be of sizes and designs as recommended by the manufacturer of the paint being sprayed.
7. The first coat on concrete surfaces in immersion service should be sprayed and back rolled.

3.11 PROTECTION AND CLEANUP

A. It shall be the responsibility of the Contractor to protect at all times, in areas where painting is being done, floors, materials of other crafts, equipment, vehicles, fixtures, and finished surfaces adjacent to paint work. Cover all electric plates, surface hardware, nameplates, gauge glasses, etc., before start of painting work.

B. At the option of the County during the course of this project, the Contractor will contain all spent abrasives, old paint chips, paint overspray and debris by means suitable to the County, including, but not limited to, full shrouding of the area.

C. If shrouding is required, the Contractor must provide a complete design of the intended

shroud or cover. Care must be taken not to modify or damage the structure during the use of the shroud. If damage should occur, the Contractor is held responsible for all repairs.

D. At completion of the work, remove all paint where spilled, splashed, spattered, sprayed or smeared on all surfaces, including glass, light fixtures, hardware, equipment, painted and unpainted surfaces.

E. After completion of all painting, the Contractor shall remove from job site all painting equipment, surplus materials and debris resulting from this work.

F. The Contractor is responsible for the removal and proper disposal of all hazardous materials from the job site in accordance with Local, State and Federal requirements as outlined by the Environmental Protection Agency.

G. A notarized statement shall be presented to the County that all hazardous materials have been disposed of properly including, but not limited to: name of disposal company, disposal site, listing of hazardous materials, weights of all materials, cost per pound and EPA registration number.

3.12 TOUCH-UP AND TOUCH-UP MATERIALS

A. All areas which require field touch-up after erection, such as welds, burnbacks, and mechanically damaged areas, shall be prepared per the Manufacturer's latest written recommendations.

B. Strict adherence to manufacturer's complete touch-up recommendations shall be followed. Any questions relative to compatibility of products shall be brought to the Owner and Manufacturer's attention. Otherwise, Contractor assumes full responsibility.

C. The Contractor shall provide, at the end of the Project, at least one (1) gallon of each generic topcoat in each color as specified by the Owner for future touch-up. Two gallons may by required for (2) component materials.

3.13 ON-SITE INSPECTION

During the course of this Project, the Owner will reserve the option of incorporating the services of a NACE Level III inspection service. The inspection service will be responsible for assuring the proper execution of this Specification by the successful Contractor.

3.14 RIVER CROSSING – PIPE AND SUPPORTS

A. System No. 700-1: Zinc/Epoxy/Fluoropolymer (New Steel or Ductile Iron Pipes)

This system provides outstanding resistance to ultra-violet light degradation and extremely good color and gloss retention. This system will have excellent resistance to abrasion and chalking, and is recommended for coastal environments and on structures where extremely long-term maintenance cycles are desired. This system is to be applied to new steel and ductile iron materials. pipes. (Note: Series 700 is gloss. If the Owner desires a semi-gloss finish then Series 700 may be replaced with Series 701.) Note: For single-component application, Series 90G-1k97 may be substituted as the primer.

Minimum Performance Requirements for Primer:

Zinc Pigment: 83% by weight in dried film

Adhesion: ASTM D4541 (Type II) - No less than 1,442 psi (9.94 MPa) adhesion, average of three tests.

Salt Spray: ASTM B117 - No blistering, cracking or delamination of film. No more than 1/8" creepage at scribe and no more than 1% rusting on plane after 50,000 hours exposure.

Minimum Performance Requirements for 2nd Coat:

Adhesion: ASTM D4541 - No less than 1,909.3 psi (13.16 MPa) adhesion after ten freeze/thaw cycles, average of three trials.

Salt Spray: ASTM B117 - No blistering, cracking, rusting or delamination of the film and no creepage at the scribe after 4000 hours

Minimum Performance Requirements for 3rd Coat:

Exterior Exposure: ASTM D1014 (AAMA 2604-98) (South Florida Marine Exposure) - exceeds the exterior weathering requirements of the American Architectural Manufacturers Association (AAMA) 2604-98 standard.

Exterior Exposure: ASTM D4141, Method C (EMMAQUA) - No blistering, cracking or chalking. No less than 100% gloss retention, no more than 1 unit gloss loss and no more than 0.23 DE_{Hunter} color change (white) after 1,500 MJ/m² (69,109MJ/m² total) EMMAQUA exposure.

QUV Exposure: ASTM D4587 - No blistering, cracking or chalking. No less than 61% gloss retention (31.4 units gloss change) and 1.89 DE_{FMC2} (MacAdam units) color change (white) after 25,000 hours exposure.

Xenon Arc Weathering: ASTM D6695 - No blistering, cracking or chalking. No less than 87% gloss retention (11.9 units gloss change) and no greater than 0.37 DE_{00} color change (white) after 8,000 hours Xenon Arc exposure.

Surface Preparation: **Steel -** SSPC-SP6/NACE No.3 Commercial Blast Cleaning with a minimum 1.5 mil angular anchor profile. **Ductile Iron Pipe -** Uniformly abrasive blast using angular abrasive to a NAPF 500-03-04: External Pipe Surface condition. **Cast Ductile Fittings -** Uniformly abrasive blast using angular abrasive to a NAPF 500-03-05: Fitting Blast Clean #2 condition.

Primer: Series 90-97 Tneme-Zinc	2.5 - 3.5 mils
2nd Coat: Series 66HS Hi-Build Epoxoline	2.0 - 3.0 mils
3rd Coat: Series 700 Hydroflon	2.0 - 3.0 mils
	Total Dry Film Thickness: 6.5 - 9.5 mils
	Minimum Dry Film Thickness: 8.0 mils
	Minimum Dry Film Thickness: 8.0 mils

Steel pipe supports shall be shop painted. Ductile iron pipe shall be shop primed and field painted.

The finish paint color for the potable water and dry force main pipes and pipe supports

shall match the new bridge color and be selected by the Owner. During Shop Drawing review, the Contractor shall submit proposed color chips for Owner approval or selection.

3.15 PVC PIPE

A. EXTERIOR OR INTERIOR

System No. 1095-5: Acrylic Polyurethane

This system provides a user friendly, low VOC, aliphatic polyurethane coating which offers excellent color and gloss retention.

Minimum Performance Requirements for Both Coats:

Generic Type: Aliphatic Acrylic Polyurethane

Volatile Organic Compounds (Thinned 5%): 0.77 lbs/gallon (92 grams/litre)

QUV Exposure: ASTM D4587 (UVA-340 bulbs, 8 hours UV, 4 hours condensation) - No blistering, cracking or delamination. No less than 52% gloss retention or 23 units gloss change and .59 $DE_{CIE2000}$ color change (white) after 2,000 hours exposure.

Surface Preparation: SSPC-SP1 followed by hand or power sanding to thoroughly and uniformly scarify and de-gloss the surface.

Two Coats: 1095 Endurashield
Dry Film Thickness: 2.0-3.0 mils per coat.

3.16 GALVANIZED STEEL - PIPE AND MISCELLANEOUS FABRICATIONS

A. EXTERIOR (NON-IMMERSION)

System No. 1095-4: Epoxy/High Build Urethane

Series 66HS has excellent adhesion to galvanized steel. This system is highly resistant to abrasion, wet conditions, corrosive fumes and chemical contact. Provides 3-4 times the color and gloss retention of conventional paints. First coat to be same color as or close to the finish color. Specify Series 1074U Endura-Shield for gloss finish.

Minimum Performance Requirements for 1st Coat:

Adhesion: ASTM D4541 - No less than 1,909.3 psi (13.16 MPa) adhesion after ten freeze/thaw cycles, average of three trials.

Salt Spray: ASTM B117 - No blistering, cracking, rusting or delamination of the film and no creepage at the scribe after 4000 hours

Minimum Performance Requirements for 2nd Coat:

Generic Type: Aliphatic Acrylic Polyurethane

Volatile Organic Compounds (Thinned 5%): 0.77 lbs/gallon (92 grams/litre)

QUV Exposure: ASTM D4587 (UVA-340 bulbs, 8 hours UV, 4 hours condensation) - No blistering, cracking or delamination. No less than 52% gloss retention or 23 units gloss change and .59 $DE_{CIE2000}$ color change (white) after 2,000 hours exposure.

Surface Preparation: SSPC-SP1 Solvent Cleaning, followed by mechanically abrading (SSPC-SP7/NACE No.4, minimum angular anchor profile of 1.5 mils)

1st Coat: Series 66HS Hi-Build Epoxoline	2.0 - 4.0 mils
2nd Coat: Series 1095 Endura-Shield	2.0 - 5.0 mils
	Total Dry Film Thickness: 4.0 - 9.0 mils
	Minimum Dry Film Thickness: 5.0 mils

3.17 STEEL - STRUCTURAL, TANKS, PIPES AND EQUIPMENT

A. EXTERIOR EXPOSURE (NON-IMMERSION)

1. System No. 1095-1: Epoxy/High Build Urethane

This system is highly resistant to abrasion, wet conditions, corrosive fumes and chemical contact. Provides 3-4 times the color and gloss retention of conventional paints. Second coat to be close to finish color but not the same color. This system should be used for above ground exterior steel surfaces that are neither submerged, nor buried. Note: 161HS may be substituted for Series 66HS for low temperature cure or quick recoats.

Minimum Performance Requirements for Shop and 2nd Coats:

Adhesion: ASTM D4541 - No less than 1,909.3 psi (13.16 MPa) adhesion after ten freeze/thaw cycles, average of three trials.

Salt Spray: ASTM B117 - No blistering, cracking, rusting or delamination of the film and no creepage at the scribe after 4000 hours

Minimum Performance Requirements for 3rd Coat:

Generic Type: Aliphatic Acrylic Polyurethane

Volatile Organic Compounds (Thinned 5%): 0.77 lbs/gallon (92 grams/litre)

QUV Exposure: ASTM D4587 (UVA-340 bulbs, 8 hours UV, 4 hours condensation) - No blistering, cracking or delamination. No less than 52% gloss retention or 23 units gloss change and .59 $DE_{CIE2000}$ color change (white) after 2,000 hours exposure.

Surface Preparation: SSPC-SP6/NACE No.3 Commercial Blast Cleaning with a minimum 1.5 mil angular anchor profile.

Shop Coat: Series 66HS-1211 Epoxoline Primer	3.0 - 4.0 mils
2nd Coat: Series 66HS Hi-Build Epoxoline	2.0 - 3.0 mils
3rd Coat: Series 1095 Endura-Shield	2.0 - 5.0 mils
	Total Dry Film Thickness: 7.0 - 12.0
	Minimum Dry Film Thickness: 8.0 mils

3.18 PROJECT DESIGNER SYSTEMS REFERENCE GUIDE

A. RIVER CROSSING – PIPE AND SUPPORTS

3.14.A System No. 700-1: Zinc/Epoxy/Fluoropolymer (New Steel)

B. PVC PIPE EXTERIOR/INTERIOR EXPOSURE

3.15.A System No. 1095-5: Acrylic Polyurethane

C. GALVANIZED STEEL-PIPE AND MISCELLANEOUS FABRICATORS

EXTERIOR (NON-IMMERSION)
3.16.A System No. 1095-4: Epoxy/High Build Urethane

D. STEEL

EXTERIOR (NON-IMMERSION)
3.17.A.1 System No. 1095-1: Epoxy/High Build Urethane

3.19 COATING SCHEDULE - TO BE DEVELOPED BY PROJECT AS NEEDED

END OF SECTION

Category				Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Piping	Pressurized PVC AWWA C900-16	Standard Push-On Joint	4" and Larger		✓	✓	✓	JM Eagle	Blue Brute (C900)/ Big Blue (C905)	Pipe size 14" shall only be used with written approval by Manatee County All PVC pipe shall be color-coded per service application **Potable/Reclaimed Water:** 4" - 12": Pressure Class 235, DR 18, Ductile Iron Pipe Size (DIPS), AWWA C900-16 For uncontaminated soils: Shall have EPDM rubber gaskets with the letters "EPDM" factory embossed or edged into the gasket For contaminated soils: Shall have NBR or FKM rubber gasket Refer to PVC Pressurized Pipe and Fittings Section 02622 for gasket material details Pipe and gaskets shall be NSF61 certified for potable water **Wastewater:** 4" - 36": Pressure Class 235, DR 18, DIPS, AWWA C900-16 **Self-Restrained Push-On Joint:** All self-restrained push-on joint pipe shall be field checked for proper engagement per manufacturer's recommendations Pipe shall have weather-resistant, min. 6 mil thick, 4" wide, solid red PVC marking tape around bell RieberLok: Gaskets shall only be used on manufacturer approved pipe Bulldog Restraint: Gaskets shall only be factory applied to Diamond Plastics "Lok 21" and JM Eagle's "Eagle Loc 900" Pipe
					✓	✓	✓	Diamond Plastics Corp.	C900/Trans-21	
					✓	✓	✓	North American Pipe Corp.	C900/IB	
					✓	✓	✓	National Pipe & Plastics	Dura-Blue C900	
					✓	✓	✓	Sanderson Pipe	C900	
		Self-Restrained Push-On Joint	4" - 24"		✓	✓	✓	Bulldog Restraint	Bulldog Gasket	
			4" - 12"		✓	✓	✓	RieberLok	RieberLok Gasket	
	Gravity Sewer PVC	4" - 15"					✓	JM Eagle	Ring-Tite Gravity Sewer	Pipe size 14" shall only be used with prior written approval by Manatee County Push-on joints shall use elastomeric gaskets in accordance with ASTM D3212 Pipe shall be color coded green for sewer applications 4"-15" shall be SDR 26, ASTM D3034
							✓	Diamond Plastics Corp.	Sani-21	
							✓	North American Pipe Corp.	ASTM D3034/IB	
							✓	National Pipe & Plastics	Sewer ASTM D3034/F679	
							✓	Sanderson Pipe	ASTM D3034/IB	
		18" - 54"					✓	JM Eagle	Big Blue (C905)	Push-on joints shall use elastomeric gaskets in accordance with ASTM D3212 Pipe shall be color coded green for sewer applications 18"-54" shall be DR 25, AWWA C900-16
							✓	Diamond Plastics Corp.	C900/Trans-21	
							✓	North American Pipe Corp.	C900/IB	
							✓	National Pipe & Plastics	Dura-Blue C900	

Contractor shall check/mark which product is intended to be used in the submittal box. If multiple manufacturers are to be used, each manufacturer shall be marked.

Category				Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Piping	HDPE	For Mains	2" and Larger		✓	✓	✓	JM Eagle	HDPE (DIPS) Pressure Pipe	Pressure Class 200, PE4710, Ductile Iron Pipe Size (DIPS), DR 11, AWWA C906 Min. Cell Classification per ASTM D3350 shall be 445574 Pipe sizes 3" & 14" shall only be used with prior written approval by Manatee County All HDPE pipe must have color coded striping on 3-sides (120 degree apart) per service application **Potable/Reclaimed Water:** For pipe sizes 2"-12" in non-roadway applications HDPE pipe shall only be installed in roadways with prior written approval by Manatee County Pipe sizes 16" and larger shall only be used with prior written approval by Manatee County Pipe shall be NSF61 certified for potable water **Wastewater:** For pipe sizes 4" - 36"
					✓	✓	✓	WL Plastics	PE 4710 (DIPS)	
					✓	✓	✓	GF Central Plastics	Design-Flow PE100/PE4710	
					✓	✓	✓	Performance Pipe	DriscoPlex 4000	
					✓	✓	✓	Endot	PE 4710 (DIPS)	
					✓	✓	✓	Charter Plastics	PE 4710 - Blue/Lavender/ Green Stripe	
	PE	For Services	2" and Smaller		✓	✓		Endot	Endopure	Pressure Class 250, PE4710, Copper Tube Size (CTS), SDR 9, AWWA C901 Min. Cell Classification per ASTM D3350 shall be 445574 Tubing shall be fully color coded blue for potable water or purple for reclaimed water services Tubing shall be NSF61 certified for potable water Butt-Fusion or CTS brass connections shall be used
					✓	✓		ADS	Polyflex	
					✓			Charter Plastics	4710 - CTS Tubing	
	PEX				✓	✓		Rehau	Municipex	Pressure Class 200, PEXa 3306, Copper Tube Size (CTS), SDR 9, AWWA C904 Tubing shall be fully color coded blue for potable water or purple for reclaimed water services Tubing shall be NSF61 certified for potable water Butt-Fusion or CTS brass connections shall be used

Contractor shall check/mark which product is intended to be used in the submittal box. If multiple manufacturers are to be used, each manufacturer shall be marked.

Category				Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Piping	Ductile Iron AWWA C150/C151	Flanged Joint	4" and Larger		✓	✓	✓	American Cast Iron Pipe Company	Flanged Joint	**Pipe Ratings:** Aboveground Installation: Flanged Joint, 250 PSI, Special Class 53 Buried Installation: Mechanical Joint, 350 PSI for 4"-16", 250 PSI for 18" and larger Buried pipe shall be wrapped with an approved external polyethylene encasement color coded blue for potable water, purple for reclaimed water, and green for sewer **Potable/Reclaimed Water:** For pipe sizes 4" and larger Interior Coating: Std. thickness cement lining per AWWA C104 Exterior Coating: Std. 1-mil asphaltic coating per AWWA C151 or a factory-applied epoxy coating per AWWA C116 For uncontaminated soils: Shall have EPDM rubber gaskets with the letters "EPDM" factory embossed or edged into gasket For contaminated soils: Shall have NBR or FKM rubber gasket Refer to Ductile Iron Pipe and Fittings Section 02615 for gasket material details Pipe and gaskets shall be NSF61 certified for potable water **Wastewater:** For force mains: Pipe sizes 36" or larger For lift station aboveground metering assemblies: All sizes Holiday-free factory certification per ASTM G62, Method B (High-Voltage) shall be provided for the interior coating at the point of delivery Interior Coating: Green, factory applied dry film thickness 40-mil Tnemec Series 431 Perma-Shield PL or Permox CTF coating Exterior Coating: Std. 1-mil asphaltic coating per AWWA C151 or a factory-applied epoxy coating per AWWA C116 **Self-Restrained Push-On Joint:** All self-restrained push-on joint pipe shall have weather-resistant, min. 6 mil thick, 4" wide, solid red PVC marking tape around bell
					✓	✓	✓	McWane Ductile	Flanged Joint	
					✓	✓	✓	U.S. Pipe	Flanged Joint	
		Standard Push-On Joint			✓	✓	✓	American Cast Iron Pipe Company	Fastite Joint	
					✓	✓	✓	McWane Ductile	Tyton Joint	
					✓	✓	✓	U.S. Pipe	Tyton Joint	
		Self-Restrained Push-On Joint			✓	✓	✓	American Cast Iron Pipe Company	Fastite Joint w/ Amarillo Fast-Grip Gasket (4" - 24")	
					✓	✓	✓		Lok-Ring Joint (54" - 64")	
					✓	✓	✓		Flex-Ring Joint (4" - 54")	
					✓	✓	✓	McWane Ductile	Tyton Joint w/ Sure Stop 350 Gasket (4" -24")	
					✓	✓	✓		TR Flex Joint (4" - 36")	
					✓	✓	✓	U.S. Pipe	Tyton Joint w/ Field Lok 350 Gasket (4" -16")	
					✓	✓	✓		HP Lok Joint (30"-64")	
					✓	✓	✓		TR Flex Joint (4" - 36")	

Contractor shall check/mark which product is intended to be used in the submittal box. If multiple manufacturers are to be used, each manufacturer shall be marked.

Category			Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Piping	Pressurized PVC ASTM D2241	3" and Smaller		✓	✓		JM Eagle	Ring-Tite	Shall only be used for water/reclaimed water service casings in roadway Pressure Class 200, SDR 21, Iron Pipe Size (IPS), ASTM D2241
				✓	✓		Diamond Plastics Corp.	D2241	
				✓	✓		North American Pipe Corp.	ASTM D2241/IB	
				✓	✓		National Pipe & Plastics	Dura-Flow SDR Series	
	Pressurized Sch. 80 PVC ASTM D1785	2" and Smaller				✓	North American Pipe Corp. Products	-	Shall only be used for grinder pump stations Iron Pipe Size (IPS), ASTM D1785 Only for working pressures up to 125 psi
						✓	JM Eagle Products	-	
						✓	GF Central Plastics Products	-	
						✓	Charlotte Pipe Products	-	
						✓	Harrison Plastic Products	-	
	Fiberglass	Centrifugally Cast				✓	Hobas Products	-	Shall only be used for slip lining existing gravity sewer main Bell and Spigot shall meet requirements of ASTM D3262 O-ring or profile type elastomeric gasket shall meet requirements of ASTM F477
		Filament Wound				✓	Flowtite Products	-	

Contractor shall check/mark which product is intended to be used in the submittal box. If multiple manufacturers are to be used, each manufacturer shall be marked.

Category			Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Fittings	Ductile Iron AWWA C110/C153	For Pressurized PVC C900-16 and DI Pipe		✓	✓	✓	Sigma Corp. Products	-	**Mechanical Joint Fittings (Buried Installations Only):** 4" - 16": 350 psi pressure rating 18" and larger: 250 psi pressure rating **Flanged Fittings (Aboveground Installations Only):** All sizes: 250 psi pressure rating Buried fittings shall be wrapped with an approved external polyethylene encasement color coded blue for potable water, purple for reclaimed water, and green for sewer For buried installations: T-bolts, bolts, tie rods, nuts, and washers shall be High Strength, Low Alloy Steel conforming to AWWA C111/ANSI A21.11-17 or ASTM A242. Hardware referenced above shall be coated with a blue fluoropolymer coating (Xylan 1424, FluoroKote #1 or AFT-PTFE-Blue). Alternatively, hardware shall be 316 SS. For aboveground installations: T-bolts, bolts, tie rods, nuts, and washers shall be 316 SS **Potable/Reclaimed Water:** Interior Coating: Double the std. thickness cement lining per AWWA C104 Exterior Coating: Std. 1-mil asphaltic coating per AWWA C110/C153 or a factory-applied epoxy coating per AWWA C116 For uncontaminated soils: Shall have EPDM rubber gaskets with the letters "EPDM" embossed or laser edged into gasket For contaminated soils: Shall have NBR or FKM rubber gasket Refer to Ductile Iron Pipe and Fittings Section 02615 for gasket material details Fittings and gaskets shall be NSF61 certified for potable water **Wastewater:** Holiday-free factory certification per ASTM G62, Method B (High-Voltage) shall be provided for the interior coating at the point of delivery Interior Coating: Green, factory applied dry film thickness 40-mil Tnemec Series 431 Perma-Shield PL or Permox CTF coating Exterior Coating: Std. 1-mil asphaltic coating per AWWA C110/C153 or a factory-applied epoxy coating per AWWA C116
				✓	✓	✓	Star Pipe Products	-	
				✓	✓	✓	Infact Corp.	Flex T-2/T-3	
				✓	✓	✓	SIP Industries Products	-	
				✓	✓	✓	Tyler/Union Products	-	

Contractor shall check/mark which product is intended to be used in the submittal box. If multiple manufacturers are to be used, each manufacturer shall be marked.

Category			Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Fittings	Molded and Fabricated HDPE	For HDPE AWWA C906 Pipe				✓	GF Central Plastics Products	-	<u>Shall only be used in lift stations</u> Pressure Class 200, PE4710, Ductile Iron Pipe Size (DIPS), DR 11, AWWA C906 Min. Cell Classification per ASTM D3350 shall be 445574 Fittings shall be fused per manufacturer's recommendations
						✓	Charter Plastics Products	-	
						✓	Performance Pipe Products	-	
						✓	Specified Fittings Products	-	
						✓	Integrity Fusion Products	-	
	Molded and Fabricated PVC	For Pressurized PVC AWWA C900-16 Pipe				✓	NACO	Pressure Gasketed Fittings	<u>Shall only be used for P-traps and drop manholes</u> All fittings shall be connected via water-tight push-on joints using elastomeric gaskets per ASTM D3139 rated for pressurized PVC Pressure Class 150, DR 18, AWWA C900-16/C907
						✓	Harrington Corp	C900 Fittings	
						✓	Multi Fittings Corp.	C900/C905 Fittings	
						✓	Specified Fittings	C900 Fittings	
		For Gravity Sewer PVC AWWA C900-16 Pipe (18" and Larger)				✓	Harrington Corp	C900 Fittings	All fittings shall be connected via water-tight push-on joints using elastomeric gaskets per ASTM D3212 rated for gravity sewer PVC 18" - 54": DR 25, AWWA C900-16/C907
						✓	Multi-Fittings Corp.	C900/C907 Fittings	
						✓	North American Pipe Corp.	N-Series	
		For Gravity Sewer PVC ASTM D3034 Pipe				✓	Harrington Corp.	SDR 26 Fittings	All fittings shall be connected via water-tight push-on joints using elastomeric gaskets per ASTM D3212 rated for gravity sewer PVC 4" - 15": SDR 26, ASTM D3034
						✓	Multi Fittings Corp.	Trench Tough Plus	
						✓	Tigre-ADS USA	SDR 26 Gasketed	
						✓	North American Pipe Corp.	G-Series	

Contractor shall check/mark which product is intended to be used in the submittal box. If multiple manufacturers are to be used, each manufacturer shall be marked.

Category				Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
External Thrust Restraint Devices	PVC AWWA C900-16 (4" - 12")	Pipe to Pipe connections	Split-Casing (Only for Existing Construction)		✓	✓	✓	Ford Meter Box Co.	Series UFR1390-C (DI, PVC) (4" - 12")	**New Construction:** All sizes: 235 psi rating Buried thrust restraints shall be wrapped with an approved external polyethylene encasement color coded blue for potable water, purple for reclaimed water, and green for sewer For buried installations: T-bolts, tie rods, nuts, and washers shall be High Strength, Low Alloy Steel conforming to AWWA C111/ANSI A21.11-17 or ASTM A242. Side clamping bolts shall be medium carbon steel per SAE J429 Grade 5/ASTM A449 Side clamping nuts shall be medium carbon steel per SAE J995 Grade 2/ASTM A449 Hardware referenced above shall be coated with a blue fluoropolymer coating (Xylan 1424, FluoroKote #1, or AFT-PTFE-Blue). Alternatively, hardware shall be 316 SS. For aboveground installations: T-bolts, tie rods, nuts, and washers shall be 316 SS Side clamping bolts shall be min. 316 SS per ASTM A193 Grade B8M, Class 2 Side clamping nuts shall be min. 316 SS per ASTM A194 Grade 8M, Class 1 **Restraint devices shall have the following factory applied high performance coatings:** Star Pipe Products: Starbond System Sigma Corp.: CORRSAFE System EBAA Iron: MEGA-BOND System Ford Meter Box Co.: Armorguard E-Coat System SIP Industries: EZ Shield System **Potable/Reclaimed Water:** For uncontaminated soils: Shall have EPDM rubber gaskets with the letters "EPDM" factory embossed or edged into gasket For contaminated soils: Shall have NBR or FKM rubber gasket Refer to Valves and Appurtenances Section 02640 for gasket material details
					✓	✓	✓	Star Pipe Products	PVC Series 1100G2C (4" - 12")	
					✓	✓	✓	Sigma Corp.	PV-LOK Series D-PWP (DI, PVC) (4" - 12")	
			Wedge-Restraint (New Construction)		✓	✓	✓	Star Pipe Products	PVC Stargrip Series 4100P (4" - 12")	
					✓	✓	✓	Sigma Corp.	ONE-LOK Series SLCEH (4" - 12")	
		Pipe to MJ Fittings connections	Split-Casing (Only for Existing Construction)		✓	✓	✓	Star Pipe Products	PVC Series 1000G2 (DI, PVC) (4" - 12")	
					✓	✓	✓	Sigma Corp.	PV-LOK Series PWM-C (4" - 12")	
			Wedge-Restraint (New Construction)		✓	✓	✓	EBAA Iron	Series 2000PV (4" - 12")	
					✓	✓	✓	Star Pipe Products	PVC Stargrip Series 4000 (HDPE, PVC) (4" - 12")	
					✓	✓	✓	SIP Industries	EZ Grip Series EZPVCP (4" - 12")	
					✓	✓	✓	Sigma Corp.	ONE-LOK Series D-SLCE (4" - 12")	
		Pipe to PVC Fittings connections	All Construction		✓	✓	✓	EBAA Iron	Series 2600 (4" - 12")	
					✓	✓	✓	Star Pipe Products	Series 1200G2C (4" - 12")	
					✓	✓	✓	SIP Industries	Series PTPFC (4" - 12")	
					✓	✓	✓	Sigma Corp.	PV-LOK Series PWPF (4" - 12")	

Contractor shall check/mark which product is intended to be used in the submittal box. If multiple manufacturers are to be used, each manufacturer shall be marked.

Category				Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
External Thrust Restraint Devices	PVC AWWA C900-16 (14" - 36")	Pipe to Pipe connections	Split-Casing (Only for Existing Construction)		✓	✓	✓	Star Pipe Products	Series 1100C (14" - 36")	**New Construction:** All sizes: 235 psi rating Buried thrust restraints shall be wrapped with an approved external polyethylene encasement color coded blue for potable water, purple for reclaimed water, and green for sewer For buried installations: T-bolts, tie rods, nuts, and washers shall be High Strength, Low Alloy Steel conforming to AWWA C111/ANSI A21.11-17 or ASTM A242. Side clamping bolts shall be medium carbon steel per SAE J429 Grade 5/ASTM A449 Side clamping nut shall be medium carbon steel per SAE J995 Grade 2/ASTM A449 Hardware referenced above shall be coated with a blue fluoropolymer coating (Xylan 1424, FluoroKote #1, or AFT-PTFE-Blue). Alternatively, hardware shall be 316 SS. For aboveground installations: T-bolts, tie rods, nuts, and washers shall be 316 SS Side clamping bolts shall be min. 316 SS per ASTM A193 Grade B8M, Class 2 Side clamping nuts shall be min. 316 SS per ASTM A194 Grade 8M, Class 1 **Restraint devices shall have the following factory applied high performance coatings:** Star Pipe Products: Starbond System Sigma Corp.: CORRSAFE System EBAA Iron: MEGA-BOND System Ford Meter Box Co.: Armorguard E-Coat System SIP Industries: EZ Shield System **Potable/Reclaimed Water:** For uncontaminated soils: Shall have EPDM rubber gaskets with the letters "EPDM" factory embossed or edged into gasket For contaminated soils: Shall have NBR or FKM rubber gasket Refer to Valves and Appurtenances Section 02640 for gasket material details *This split-casing model is allowed for new construction for these specific sizes to ensure entire size range is covered
					✓	✓	✓	Sigma Corp.	PV-LOK Series D-PWP (DI, PVC) (14" - 36")	
			Wedge-Restraint (New Construction)		✓	✓	✓	EBAA Iron	Megalug Series 2800 (14" - 16")	
					✓	✓	✓	Star Pipe Products	PVC Stargrip Series 4400 (14" - 20")	
					✓	✓	✓		Series 1100C* (24" - 36")	
					✓	✓	✓	Ford Meter Box Co.	Series UFR1390-C* (DI, PVC) (24" - 36")	
		Pipe to MJ Fittings connections	Split-Casing (Only for Existing Construction)		✓	✓	✓	Star Pipe Products	Series 1000C (14" - 36")	
					✓	✓	✓	Sigma Corp.	PV-LOK Series D-PWM (14" - 24")	
			Wedge-Restraint (New Construction)		✓	✓	✓	EBAA Iron	Series 2000PV (HDPE, PVC) (14" - 16", 24")	
					✓	✓	✓	Star Pipe Products	PVC Stargrip Series 4000 (HDPE, PVC) (14" - 36")	
					✓	✓	✓	SIP Industries	EZ Grip Series EZPVCP (14" - 36")	
					✓	✓	✓	Sigma Corp.	ONE-LOK Series D-SLCE (HDPE, PVC) (24" - 36")	
		Pipe to PVC Fittings connections	All Construction		✓	✓	✓	Sigma Corp.	PV-LOK Series PWPF (14" - 24")	

Category				Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
External Thrust Restraint Devices	HDPE AWWA C906	Pipe to MJ Fittings connections	Split-Casing (Only for Existing Construction)		✓	✓	✓	EBAA Iron	Series 15PF00 (4" - 12")	**New Construction:** All sizes: 160 psi rating Buried thrust restraints shall be wrapped with an approved external polyethylene encasement color coded blue for potable water, purple for reclaimed water, and green for sewer For buried installations: T-bolts, tie rods, nuts, and washers shall be High Strength, Low Alloy Steel conforming to AWWA C111/ANSI A21.11-17 or ASTM A242. Side clamping bolts shall be medium carbon steel per SAE J429 Grade 5/ASTM A449 Side clamping nut shall be medium carbon steel per SAE J995 Grade 2/ASTM A449 Hardware referenced above shall be coated with a blue fluoropolymer coating (Xylan 1424, FluoroKote #1, or AFT-PTFE-Blue). Alternatively, hardware shall be 316 SS. For aboveground installations: T-bolts, tie rods, nuts, and washers shall be 316 SS Side clamping bolts shall be min. 316 SS per ASTM A193 Grade B8M, Class 2 Side clamping nuts shall be min. 316 SS per ASTM A194 Grade 8M, Class 1 All restrained joints shall be designed for HDPE Pipe conforming to AWWA C906 and Ductile Iron Pipe Size (DIPS) Dimensions Shall include 316 SS pipe stiffening insert ABS Spacers shall not be removed from actuating bolts on HDPE Pipe (DIPS) **Restraint devices shall have the following factory applied high performance coatings:** Star Pipe Products: Starbond System Sigma Corp.: CORRSAFE System EBAA Iron: MEGA-BOND System Ford Meter Box Co.: Armorguard E-Coat System SIP Industries: EZ Shield System **Potable/Reclaimed Water:** For uncontaminated soils: Shall have EPDM rubber gaskets with the letters "EPDM" factory embossed or edged into gasket For contaminated soils: Shall have NBR or FKM rubber gasket Refer to Valves and Appurtenances Section 02640 for gasket material details
					✓	✓	✓		Series 15MJ00 (4" - 12")	
					✓	✓	✓	Sigma Corp.	PV-LOK Series PVM-C (4" - 12)	
			Wedge-Restraint (New Construction)		✓	✓	✓	EBAA Iron	Series 2000PV (HDPE, PVC) (4" - 12")	
					✓	✓	✓	Star Pipe Products	PVC StarGrip Series 4000 (HDPE, PVC) (4" - 18")	
					✓	✓	✓	Sigma Corp.	ONE-LOK Series D-SLCE (HDPE, PVC) (4" - 12")	

Contractor shall check/mark which product is intended to be used in the submittal box. If multiple manufacturers are to be used, each manufacturer shall be marked.

Category				Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
External Thrust Restraint Devices	Ductile Iron Pipe AWWA C150 & C151	Pipe to Pipe connections	Split-Casing (Only for Existing Construction)		✓	✓	✓	EBAA Iron	Series 1500TD (DI, PVC) (4" - 12")	**New Construction:** 2" - 16": 350 psi rating 18" and larger: 250 psi rating Buried thrust restraints shall be wrapped with an approved external polyethylene encasement color coded blue for potable water, purple for reclaimed water, and green for sewer For buried installations: T-bolts, tie rods, nuts, and washers shall be High Strength, Low Alloy Steel conforming to AWWA C111/ANSI A21.11-17 or ASTM A242. Side clamping bolts shall be medium carbon steel per SAE J429 Grade 5/ASTM A449 Side clamping nuts shall be medium carbon steel per SAE J995 Grade 2/ASTM A449 Hardware referenced above shall be coated with a blue fluoropolymer coating (Xylan 1424, FluoroKote #1, or AFT-PTFE-Blue). Alternatively, hardware shall be 316 SS. For aboveground installations: T-bolts, tie rods, nuts, and washers shall be 316 SS Side clamping bolts shall be min. 316 SS per ASTM A193 Grade B8M, Class 2 Side clamping nuts shall be min. 316 SS per ASTM A194 Grade 8M, Class 1 **Restraint devices shall have the following factory applied high performance coatings:** Star Pipe Products: Starbond System Sigma Corp.: CORRSAFE System EBAA Iron: MEGA-BOND System Ford Meter Box Co.: Armorguard E-Coat System SIP Industries: EZ Shield System **Potable/Reclaimed Water:** For uncontaminated soils: Shall have EPDM rubber gaskets with the letters "EPDM" factory embossed or edged into gasket For contaminated soils: Shall have NBR or FKM rubber gasket Refer to Valves and Appurtenances Section 02640 for gasket material details **MJ Fitting to MJ Fitting Connections in Water/Reclaimed:** Interior Coating: Std. thickness cement lining per AWWA C104 or factory-applied epoxy per AWWA C116 Exterior Coating: Std. 1-mil asphaltic coating per AWWA C110/C153 or a factory-applied epoxy coating per AWWA C116 **MJ Fitting to MJ Fitting Connections in Wastewater:** Holiday-free factory certification per ASTM G62, Method A (Low-Voltage) shall be provided for the interior coating at the point of delivery Interior Coating: Green, factory applied dry film thickness 40-mil Tnemec Series 431 Perma-Shield PL or Permox CTF coating Exterior Coating: Std. 1-mil asphaltic coating per AWWA C151 or a factory-applied epoxy coating per AWWA C116
					✓	✓	✓	Star Pipe Products	Stargrip Series 3100S (3" - 48")	
					✓	✓	✓	Sigma Corp.	ONE-LOK Series SSLDH (4" - 36")	
			Wedge-Restraint (New Construction)		✓	✓	✓	EBAA Iron	Series 1700 (4" - 48")	
					✓	✓	✓	Star Pipe Products	Stargrip Series 3100P (4" - 48")	
					✓	✓	✓	Sigma Corp.	ONE-LOK Series SLDEH (4" - 36")	
		Pipe to MJ Fittings connections	Split-Casing (Only for Existing Construction)		✓	✓	✓	EBAA Iron	Series 1100SD (4" - 48")	
					✓	✓	✓	Star Pipe Products	Split Stargrip Series 3000S (4" - 48")	
					✓	✓	✓	Sigma Corp.	ONE-LOK Series SSLDH (4" - 36")	
			Wedge-Restraint (New Construction)		✓	✓	✓	EBAA Iron	Series 1100 (4" - 48")	
					✓	✓	✓	Star Pipe Products	Stargrip Series 3000 (4" - 48")	
					✓	✓	✓	SIP Industries	EZ Grip Series EZDP (DI, PVC) (3" - 48")	
					✓	✓	✓	Sigma Corp.	ONE-LOK Series D-SLDE (4" - 48")	
		MJ Fitting to MJ Fitting Connections			✓	✓	✓	Star Pipe Products	Series 100 (3" - 36")	
					✓	✓	✓	SIP Industries	MJ x MJ Adapter (3" - 12")	
					✓	✓	✓	Infact Corp.	Foster Adapter (3" - 36")	

Contractor shall check/mark which product is intended to be used in the submittal box. If multiple manufacturers are to be used, each manufacturer shall be marked.

Category			Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Plain End Couplings	Gravity Sewer PVC ASTM D3034 Plain End to Plain End	4" - 12"				✓	Fernco Products	Series 5000 RC	Shall be reinforced with 316 SS clamp band, bolts, and nuts Shear band shall be min. 304 SS
	Dissimilar Pipe Materials Plain End to Plain End Coupling	2" - 12"		✓	✓		Romac	Macro	<u>For buried installations:</u> T-bolts, bolts, tie rods, nuts, and washers shall be High Strength, Low Alloy Steel conforming to AWWA C111/ANSI A21.11-17 or ASTM A242. Hardware referenced above shall be coated with a blue fluoropolymer coating (Xylan 1424, FluoroKote #1, or AFT-PTFE-Blue). Alternatively, hardware shall be 316 SS. <u>For aboveground installations:</u> T-bolts, bolts, tie rods, nuts, and washers shall be 316 SS **<u>Couplings shall have the following factory applied high performance coatings:</u>** Romac: Romacoat System Krausz: Factory std. min. 14 mil fusion bonded epoxy EBAA: MEGA-BOND System Holiday-free factory certification per ASTM G62, Method A (Low-Voltage) shall be provided for the interior coating at the point of delivery **<u>Potable/Reclaimed Water:</u>** Couplings and gaskets shall be NSF61 certified for potable water <u>For uncontaminated soils:</u> Shall have EPDM rubber gaskets with the letters "EPDM" factory embossed or edged into gasket <u>For contaminated soils:</u> Shall have NBR or FKM rubber gasket Refer to Valves and Appurtenances Section 02640 for gasket material details
		2" - 12"		✓	✓		Krausz	Hymax 2 Coupling (Series 860)	
		4" - 48"		✓	✓		EBAA	Mega-Coupling Series 3800	

Category			Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Flange Adapters	HDPE AWWA C906 Flange and MJ Adapters			✓	✓	✓	Charter Plastics Products	-	Pressure Class 200, PE4710, Ductile Iron Pipe Size (DIPS), DR 11, AWWA C906 Min. Cell Classification per ASTM D3350 shall be 445574 Fittings shall be fused per manufacturer's recommendations Shall have 316 SS back-up ring **Potable/Reclaimed Water:** For uncontaminated soils: Shall have EPDM rubber gaskets with the letters "EPDM" factory embossed or edged into gasket For contaminated soils: Shall have NBR or FKM rubber gasket Refer to Valves and Appurtenances Section 02640 for gasket material details
				✓	✓	✓	Improved Piping Products	-	
				✓	✓	✓	Integrity Fusion Products	-	
				✓	✓	✓	Performance Pipe Products	-	
	Pressurized PVC AWWA C900-16 Flange Adapter	4" - 20"		✓	✓	✓	EBAA Iron	Megaflange Series 2100 (DI, PVC)	**PVC Flange Adapter:** 4"-36": 235 psi rating **DIP Flange Adapter:** 2"-16": 350 psi rating 18" and larger: 250 psi rating For buried installations: T-bolts, bolts, tie rods, nuts, and washers shall be High Strength, Low Alloy Steel conforming to AWWA C111/ANSI A21.11-17 or ASTM A242. Hardware referenced above shall be coated with a blue fluoropolymer coating (Xylan 1424, FluoroKote #1, or AFT-PTFE-Blue). Alternatively, hardware shall be 316 SS. For aboveground installations: T-bolts, bolts, tie rods, nuts, and washers shall be 316 SS **Flange adapters shall have the following factory applied high performance coatings:** Star Pipe Products: Starbond System Sigma Corp.: CORRSAFE System EBAA Iron: MEGA-BOND System Ford Meter Box Co.: Armorguard E-Coat System **Potable/Reclaimed Water:** Flange adapters and gaskets shall be NSF61 certified for potable water For uncontaminated soils: Shall have EPDM rubber gaskets with the letters "EPDM" factory embossed or edged into gasket For contaminated soils: Shall have NBR or FKM rubber gasket Refer to Valves and Appurtenances Section 02640 for gasket material details
		3" - 36"		✓	✓	✓	Sigma Corp.	Sigmaflange SFA Series CP	
		4" - 20"		✓	✓	✓	Star Pipe Products	Super Flange Series 7200 (DI, PVC)	
		3" - 36"		✓	✓	✓		Starflange Series 4200	
	DIP AWWA C110 Flange Adapters	2" - 12"		✓	✓	✓	Ford Meter Box Co.	Series 420	
		3" - 20"		✓	✓	✓	EBAA Iron	Megaflange Series 2100 (DI, PVC)	
				✓	✓	✓	Star Pipe Products	Super Flange Series 7200 (DI, PVC)	
		All sizes except 18"		✓	✓	✓		Starflange Series 3200	
		All sizes except 18"		✓	✓	✓	Sigma Corp.	Sigmaflange SFA Series DP	

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Category				Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Valves	Air Release Valves				✓	✓	✓	GA Industries	Fig-929	Min. inlet size shall be 2" Orifice, float, linkage, and hardware shall be 316 SS The seal shall be made of Buna N elastomer
					✓	✓	✓	H-TEC	Model 986-SS	<u>For waterways and canals crossing only</u> Min. inlet size shall be 2" Body, bolts, nuts, and washers shall be 316 SS The seal shall be made of Buna N elastomer
	Backflow Prevention Assembly	Privately-Owned			✓			-	-	Any privately-owned backflow prevention assembly that is approved by the University of Southern California (USC), with the exception of Wilkins 375XL (3/4" and 1"), Watts LF009QT (3/4" and 1"), and Ames LF4000B (3/4" and 1"), will be accepted by Manatee County County-Owned approved models are also acceptable
		County-Owned	2-1/2" - 12"		✓			Wilkins (Zurn)	350DA	Double Check Valve Assembly w/ Meter
					✓				375DA	Reduced Pressure Zone Assembly w/ Meter
					✓				375DA-OS & Y	Reduced Pressure Zone Assembly w/ Meter (OS&Y)
					✓			Ames	2000SS	Double Check Valve Assembly
					✓				3000SS	Double Check Valve Assembly w/ Meter
					✓				4000SS	Reduced Pressure Zone Assembly
					✓				5000SS	Reduced Pressure Zone Assembly w/ Meter
			1/2" - 2"		✓			Apollo Valves	RPLF - 4A Series	Reduced Pressure Zone Assembly
					✓			Wilkins (Zurn)	975XL2	Reduced Pressure Zone Assembly
					✓			Watts	Model LF007 Series	Double Check Valve Assembly
					✓				Model 909 Series	Reduced Pressure Zone Assembly
	Ball Valves				✓	✓	✓	FNW	Fig. 200A	<u>For use with ARV</u> Body, cap, stem, and ball shall be 316 SS/CF8M Min. Cold-Working Pressure shall be 1000 PSI
					✓	✓	✓	Apollo Valves	Model 76F	
	Blowoff Valves	On Ground Discharge			✓			Hydro-Guard	HG-1	<u>Shall only be used with written approval from Manatee County</u> Design considerations shall minimally include site drainage patterns, cross connection prevention, grounding, dichlorination requirements, and discharge permits
		Pipe Discharge			✓				HG-2	

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Category				Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Valves	Corporation Stops	For Copper Pipe and HDPE Tubing	All joints made to CTS size HDPE tubing shall use SS insert stiffeners		✓	✓		Mueller	300 Model B-25028	Saddle, Compression x MIP Thread (3/4" - 2")
					✓	✓			300 Model B-25008	Direct Tap, Compression x AWWA Taper Thread (3/4" - 2")
					✓	✓			300 Model P-25028	Saddle, Pack Joint x MIP Thread (3/4" - 2")
					✓	✓			300 Model P-25008	Direct Tap, Pack Joint x AWWA Taper Thread (3/4" - 2")
					✓	✓		Ford Meter Box Co.	FB1000-x-NL	Pack Joint x AWWA Taper Thread (3/4" - 2")
					✓	✓			FB1000-x-G-NL	Grip Joint Compression x AWWA Taper Thread (3/4" - 2")
					✓	✓			FB1000-x-Q-NL	Quick Joint Compression x AWWA Taper Thread (3/4" - 2")
					✓	✓			FB1100-x-NL	Pack Joint x MIP Thread (3/4" - 2")
					✓	✓			FB1100-x-G-NL	Grip Joint Compression x MIP Thread (3/4" - 2")
					✓	✓		A.Y. McDonald	74101BCAPQ	"Q" McQuik Compression x AWWA Taper Thread (3/4" - 2")
					✓	✓			74104BCAP-22	Pack Joint x AWWA Taper Thread (3/4" - 2")
					✓	✓			74104BCAPF	FNPT x AWWA Taper Thread (3/4" - 2")
		For Copper Pipe Only			✓	✓		Mueller	300 Model B-25000	Direct Tap, Flare x AWWA Taper Thread (3/4" - 2")
					✓	✓			300 Model B-25025	Saddle, Flare x MIP Thread (3/4" - 2")
					✓	✓		Ford Meter Box Co.	FB600-x-NL	Flare x AWWA Taper Thread (3/4" - 2")
					✓	✓			FB700-x-NL	Flare x MIP Thread (3/4" - 2")
					✓	✓		A.Y. McDonald	74101B	Flare x AWWA Taper Thread (3/4" - 2")
		For Stainless Steel Pipe Only			✓	✓		Mueller	300 Model P-20045	FIP Thread x AWWA Taper Thread (3/4" -2")
					✓	✓			300 Model B-20046	FIP Thread x MIP Thread (3/4" - 2")
					✓	✓		Ford Meter Box Co.	FB1600-x-NL	FIP Thread x AWWA Taper Thread (3/4" -2")
					✓	✓			FB1700-x-NL	FIP Thread x MIP Thread (3/4" - 2")
					✓	✓		A.Y. McDonald	74101BCAPF	FIP Thread x AWWA Taper Thread (3/4" -2")
	Curb Stops	For Copper Pipe and HDPE Tubing	All joints made to CTS size HDPE tubing shall use SS insert stiffeners		✓	✓		Mueller	P25170N	Pack Joint x FIP Thread (3/4" - 2")
					✓	✓			G25170N	Grip Joint Compression x FIP Thread (3/4" - 2")
					✓	✓		Ford Meter Box Co.	B41-xxxW-NL	Pack Joint x FIP Thread (3/4" - 2")
					✓	✓			B41-xxxW-G-NL	Grip Joint Compression x FIP Thread (3/4" - 2")
					✓	✓		A.Y. McDonald	76100W-22	Compression x Compression (3/4" - 2")
					✓	✓			76100WT	Pack Joint x Pack Joint (3/4" - 2")
					✓	✓			76102WG	Compression x FIP Thread (3/4" - 2")
					✓	✓			76107T	Compression x MIP Thread (3/4" - 2")
					✓	✓			76107-22	Pack Joint x MIP Thread (3/4" - 2")
		For Stainless Steel Pipe Only			✓	✓		Mueller	P25170N	Pack Joint x FIP Thread (1/2" - 2")
					✓	✓			B20200N	FIP Thread x FIP Thread (1/2" - 2")
					✓	✓			B20242N	MIP Thread x FIP Thread (1/2" - 2")
					✓	✓		Ford Meter Box Co.	B51-xxxW-NL	Pack Joint x FIP Thread (1/2" - 2")
					✓	✓			B11-xxxW-NL	FIP Thread x FIP Thread (1/2" - 2")
					✓	✓			B81-xxxW-NL	MIP Thread x FIP Thread (1/2" - 2")
					✓	✓		A.Y. McDonald	76107	FIP Thread x MIP Thread (3/4" - 2")
					✓	✓			76107WP	MIP Thread x MIP Thread (3/4" - 2")
					✓	✓			76102W-44	PVC (DIOD) Compression x FIP Thread (3/4" - 2")
					✓	✓			76101W	FIP Thread x FIP Thread (3/4" - 2")

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Category				Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Valves	Gate Valves	Flange x Flange (NRS)	2" - 54"		✓	✓	✓	American Flow Control	Series 2500 FL x FL	<u>All sizes:</u> min. 250 psi rating Shall be resilient seated valves conforming to AWWA C515 Body and bonnet shall be ductile iron Buried valves shall have external nuts, bolts, and washers be min. 304 SS Buried valves shall have min. 304 SS stems Aboveground valves shall have external nuts, bolts and washers be 316 SS Aboveground valves shall have 316 SS stems Stem nut shall be bronze/copper Wedge shall be ductile iron fully encapsulated in EPDM rubber with the letters "EPDM" factory embossed or edged into the wedge Valves shall have factory applied, min. 8 mils DFT fusion bonded epoxy coating on the interior and exterior Holiday-free factory certification per ASTM G62, Method A (Low-Voltage) shall be provided for the interior coating at the point of delivery Aboveground valve shall have flanged ends with Outside Stem & Yoke (OS&Y) for potable/reclaimed water applications Valves 16" and larger shall be equipped with manufacturer-standard heavy duty gear type actuators with 2" square AWWA operating nut or handwheel Gearbox shall be externally adjustable, totally enclosed to prevent water infiltration, and conform to ISO 9001 standards Vertical installation shall use spur-type gear Horizontal installation shall use bevel-type gear All horizontally-installed gate valves shall require flush line **<u>Wastewater:</u>** Valves shall only be installed vertically <u>For Force Mains:</u> Gate valves only allowed sizes 24" and larger Refer to Plug Valve Section for Force Mains that are 20" and smaller <u>For Lift Stations:</u> Gate valves allowed for sizes 3" and larger Aboveground metering assembly gate valves shall be non-rising stem (NRS) type **<u>Valves 16" and larger shall come with torque-limiting device with torque trip limits preset at factory:</u>** <u>Kennedy Valves:</u> 16": 250 lb-ft, 18"-54": 450 lb-ft <u>American Flow Control Valves:</u> 16"-20": 250 lb-ft, 24": 300 lb-ft, 30"-54": 500 lb-ft <u>Clow Valves:</u> 16": 250 lb-ft, 18"-54": 450 lb-ft <u>Mueller Valves:</u> 16"-24": 100 lb-ft, 30" - 36": 200 lb-ft, 42" - 54": 350 lb-ft
			4" - 54"		✓	✓	✓	Kennedy	Model KS-RW/2638 FL x FL	
			4" - 54"		✓	✓	✓	Mueller	Model A-2361 FL x FL	
			4" - 48"		✓	✓	✓	Clow	Model 2638 FL x FL	
		Flange x Flange (OS & Y)	2" - 54"		✓	✓	✓	American Flow Control	Series 2500 FL x FL (OS & Y)	
			4" - 54"		✓	✓	✓	Kennedy	Model KS-RW/2638 FL x FL (OS & Y)	
			4" - 54"		✓	✓	✓	Mueller	Model A-2361 FL x FL (OS & Y)	
			4" - 24"		✓	✓	✓	Clow	Model 2638 FL x FL (OS & Y)	
		Mechanical Joint x Mechanical Joint	4" - 48"		✓	✓	✓	American Flow Control	Series 2500 MJ x MJ	
					✓	✓	✓	Mueller	Model A-2361 MJ x MJ	
					✓	✓	✓	Kennedy	Model KS-RW/2638 MJ x MJ	
					✓	✓	✓	Clow	Model 2638 MJ x MJ	

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Category			Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Valves	Hydrants			✓	✓		AVK	Series 2780	Shall be nostalgic-style, dry barrel conforming to AWWA C502 and be UL/FM certified Main valve shall be faced or covered with EPDM elastomer with the letters "EPDM" factory embossed or edged into the rubber Shall have one 5-inch Storz connection with two 2-1/2 inch hose nozzles All external nuts, bolts, and washers shall be min. 304 SS Upper and lower stem rod shall be min. 304 SS Nozzle cap shall be provided with a Buna N rubber O-Ring Shall have min. 8-mils DFT fusion bonded epoxy coating on the interior and exterior of hydrant elbow Shall have standard asphaltic or fusion bonded epoxy coating on the interior and exterior of stand pipe <u>Aboveground parts shall have an external UV-resistant top coat of min. 4 mils DFT as follows:</u> Kennedy: Ken-Guard TGIC Polyester Mueller: Amercoat 370 AVK: Sherwin Williams Acrolon 218 HS Polyurethane Clow: TGIC Polyester Super Coat American Flow Control: Axalta Imron 3.5 HG+ Polyurethane
				✓	✓		Mueller	Super Centurion 250	
				✓	✓		Kennedy	K81D Guardian	
				✓	✓		Clow	Medallion	
				✓	✓		American Flow Control	Darling B-84-B-5	
	Insertion Valves	4" - 12"		✓	✓		TEAM	InsertValve	Shall be resilient seated valves conforming to AWWA C515 All nuts, bolts, washers, and non-rising stem shall be min. 304 SS Wedge shall be ductile iron fully encapsulated in EPDM rubber with the letters "EPDM" factory embossed or edged into the wedge Valves shall have factory applied, min. 8 mils DFT fusion bonded epoxy coating on the interior and exterior
	Check Valves	Flapper Disk 2" - 48"		✓	✓		Valmatic	Series 500ABF	<u>All sizes:</u> min. 250 psi rating Check valve shall be lead free, ductile iron construction conforming to NSF 61 Shall be equipped with min. 17-4 SS seat position indicator and min. 304 SS backflow actuator Disk shall be fully encapsulated in EPDM rubber with the letters "EPDM" factory embossed or edged into the disk All external bolts, nuts, and washers shall be min. 304 SS Valve shall have factory-applied, min. 8 mils DFT fusion bonded epoxy coating on the interior and exterior Holiday-free factory certification per ASTM G62, Method A (Low-Voltage) shall be provided for the interior coating at the point of delivery
		Flapper Disk 2" - 24"		✓	✓		Pratt	RD Series	
		Flapper Disk 3" - 16"		✓	✓		American Cast Iron Pipe Company	Series 2100	
		Lever & Weight				✓	AVK	Series 41	**<u>2" - 12":</u>** 175 psi **<u>14" - 30"</u>**: 150 psi Check valve shall be flanged with ductile iron/cast iron body and bronze mounted single disk conforming to AWWA C508 Shall have bronze seat and body rings Hinge pins shall be extended bronze or 316 SS All external bolts, nuts, and washers shall be 316 SS Valves shall have factory applied, min. 12 mils DFT fusion bonded epoxy coating on the interior and exterior Holiday-free factory certification per ASTM G62, Method A (Low-Voltage) shall be provided for the interior coating at the point of delivery
						✓	American Flow Control	Series 52	
						✓	Kennedy	106 LW	
						✓		1106 LW	
						✓	Mueller	Series 8001	
						✓		No. A-2600-6-01	

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Category			Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Valves	Combination Pressure Reducing and Pressure Sustaining			✓	✓		Cla-Val Company	8" Model 52-01	Pressure sustaining and check valve shall be pilot operated diaphragm actuated valve with cast iron body, bronze trim, and 125-lb flanges Pilot system shall consist of two direct acting, adjustable, spring loaded diaphragm valves Pilot control valves shall be cast brass with min. 304 SS trim
				✓	✓		Singer	8" Model A106-RPS	
				✓	✓		Watts	8" Model LFF116-52	
	Plug Valves	2"				✓	Pratt	Series 611A/613A	Plug valves shall be 100% circular port, non-lubricated, eccentric type Shall be installed with the shaft on the horizontal axis so that the seat rests on the top portion of body Shall shut off bubble tight bidirectionally when pressure tested at 175 PSI for 3"-12" and 150 PSI for 14" and larger Valve body, bonnet, and gland shall be ASTM A-126 cast iron or ASTM A-526 Grade 65-45-12 ductile iron per AWWA C-517 Plug shall be ASTM A-526 Grade 65-45-12 ductile iron per AWWA C-517 Plug shall be fully vulcanized with nitrile (Buna N) rubber with a min. peel strength of 75 PSI per ASTM D429, method B Top and bottom bearings shall be 316 SS All external nuts, bolts, and washers shall be min. 304 SS Valve be equipped with manufacturer-standard worm gear type actuators with 2" square AWWA operating nut Gearbox shall be externally adjustable, totally enclosed to prevent water infiltration, and conform to ISO 9001 standards Gearbox bearings shall be oil impregnated bronze or hardened steel Gearbox worm gear shall be hardened steel or ductile iron ASTM A536 Class 65-45-12 Gearbox shaft shall be hardened steel 2": Valve seat shall have an overlay of min. 16 mils DFT high solids epoxy Shall only be allowed at grinder pump stations 3" and larger: Valve seat shall have a welded-in overlay of at least 95% pure nickel **Refer to Gate Valve Section for applications larger than 20"** **Valves shall come with torque-limiting device with torque trip limits preset at factory:** 3"-6": 150 ft-lb 8"-20": 180 ft-lb All valves shall have internal and external min. 16 mils DFT high solids epoxy coating Holiday-free factory certification per ASTM G62, Method A (Low-Voltage) shall be provided for the interior coating at the point of delivery
		3" - 12"				✓		Series 600FP/601FP	
		2"				✓	Milliken	Series 611A/613A	
		3" - 12"				✓		Series 600F/601F	
		2"				✓	GA Industries	Figure 517-T	
		3"-20"				✓		Figure 517 Eco-Centric	
	Torque Limiting Device	Trip Torque Limit: 25-250 lb-ft		✓	✓	✓	Aunspach Controls	Model D86-250	Torque limits shall be preset at factory (See specific valve section for torque limits) Permanently mount overtorque protector on the valve operating nut All hardware shall be min. 304 SSS Shall have min. 8 mils DFT fusion bonded epoxy on the interior and exterior Torque set point shall be engraved on the torque limiting device
		Trip Torque Limit: 251-500 lb-ft		✓	✓	✓		Model D86-500	
	Valve Extension Stem			✓	✓	✓	Mueller Co.	-	Extension stems and hardware shall be min. 304 SS
				✓	✓	✓	CS3 Waterworks	-	
				✓	✓	✓	GPM Fab	-	

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Category			Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Valves	Tapping Valves			✓	✓	✓	American Flow Control	Series 2500 FL x MJ	Shall be resilient seated valves conforming to AWWA C515 Shall be furnished with an alignment lip All external nuts, bolts, washers, and non-rising stem shall be min. 304 SS Wedge shall be ductile iron fully encapsulated in EPDM rubber with the letters "EPDM" factory embossed or edged into the wedge Valves shall have factory applied min. 8 mils DFT fusion bonded epoxy coating on the interior and exterior Holiday-free factory certification per ASTM G62, Method A (Low-Voltage) shall be provided for the interior coating at the point of delivery Valve 16" and larger shall be equipped with manufacturer-standard heavy duty gear type actuators with 2" square AWWA operating nut Gearbox shall be externally adjustable, totally enclosed to prevent water infiltration, and conform to ISO 9001 standards Vertical installation shall use spur-type gear Horizontal installation shall use bevel-type gear **<u>Wastewater:</u>** Valves shall only be installed vertically **<u>Tapping valves 16" and larger shall come with torque-limiting device with torque trip limits preset at factory:</u>** Refer to Gate Valve section for trip limits
				✓	✓	✓	Kennedy	Model KS-RW/2638 FL x MJ	
				✓	✓	✓	Mueller	Model T-2361 FL X MJ	
				✓	✓	✓	Clow	Series 2638 FL x MJ	
Tapping Sleeves	HDPE	4" - 30"		✓	✓	✓	JCM Industries	Model 6452/6459 (HDPE)	Sleeve and straps shall be 316 SS T-bolts, bolts, tie rods, nuts, and washers shall be 316 SS Shall have min. 1/8" thick EPDM full face gasket The letters "EPDM" and company logo shall be factory stamped with white ink on gasket Shall have 3/4" 316 SS test plug **<u>Potable/Reclaimed Water:</u>** Must hold 180 PSI for one hour Tapping sleeve and gaskets shall be NSF61 certified for potable water <u>For uncontaminated soils:</u> Shall have EPDM rubber wrap around gasket The letters "EPDM" and company logo shall be factory stamped with white ink on the wrap around gasket Alternatively, the letters "EPDM" shall be factory engraved/edged on the exterior shell of the tapping sleeve <u>For contaminated soils:</u> Shall have NBR or FKM rubber gasket Refer to Valves and Appurtenances Section 02640 for gasket material details **<u>Wastewater:</u>** Must hold 150 PSI for one hour
		4" - 24"				✓	Ford Meter Box Co.	FTSSP-xxx-x-MAN	
		4" - 12"				✓	Romac	STS423-H	
	PVC, Ductile Iron, Steel, AC	6" - 48"				✓		STS420 (316 SS)	
		6" - 12"		✓	✓			STS420 (316 SS)	
		4" - 24"				✓	Ford Meter Box Co.	Series FTSS-xxxx-x-MAN	
						✓	Cascade Waterworks	Series CST-EX (316 SS)	
						✓	PowerSeal	Series 3490 (316 SS)	
		4" - 30"		✓	✓	✓	JCM Industries	Model 6452/6459	

Contractor shall check/mark which product is intended to be used in the submittal box. If multiple manufacturers are to be used, each manufacturer shall be marked.

Category			Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Service Saddles	HDPE	4" - 12"		✓	✓	✓	Romac	STS423T-H	**Potable/Reclaimed Water:** Must hold 180 PSI for one hour Saddle body shall be made of red brass, alloy 85-5-5-5 or min. 304 SS Saddle strap shall be made of silicon bronze or min. 304 SS T-bolts, bolts, tie rods, nuts, and washers shall be red brass, alloy 85-5-5-5 or min. 304 SS Service saddle and gasket shall be NSF61 certified for potable water For uncontaminated soils: Shall have EPDM rubber gasket The letters "EPDM" and company logo shall be factory stamped with white ink on gasket Alternatively, the letters "EPDM" shall be factory engraved/edged on the exterior saddle body For contaminated soils: Shall have NBR or FKM rubber gasket Refer to Valves and Appurtenances Section 02640 for gasket material details **Wastewater:** Must hold 150 PSI for one hour Saddle body and extra wide strap shall be 316 SS T-bolts, bolts, tie rods, nuts, and washers shall be 316 SS
		2" - 12"		✓	✓	✓	Ford Meter Box Co.	Series FS313-xxx-TAP-Q	
		10" - 18"		✓	✓	✓		Series FSP323-xxx-TAP-Q	
		20" - 34"		✓	✓	✓		Series FSP333-xxx-TAP-Q	
		2" - 3"		✓	✓			FS313W-xxx-TAP	
		2" - 12"		✓	✓			Series FS313-xxx-TAP	
		10" - 18"		✓	✓			Series FSP323-xxx-TAP	
		20" - 34"		✓	✓			Series FSP333-xxx-TAP	
	PVC, Ductile Iron, Steel, AC	4" - 16"		✓	✓		Romac	202BS (Double Bolt)	
		6"- 12"		✓	✓			Model STS420T	
		6" - 42"				✓		Model STS420T (316 SS)	
		3" - 54"		✓	✓	✓	JCM Industries	Model 6438	
		3" - 54"		✓	✓			Model 438	
		2" - 12"		✓	✓			Model 502	
		4" - 12"		✓	✓		Ford Meter Box Co.	202B (DI and AC only)	
		4" - 12"		✓	✓			202BS	
		4" - 30"		✓	✓			202BSD	
		2" - 12"		✓	✓	✓		FS313-xxx-TAP-Q	
		4" - 18"		✓	✓	✓		FS323-xxx-TAP-Q	
		20" - 30"		✓	✓	✓		FS333-xxx-TAP-Q	
		2" - 12"		✓	✓			FS313-xxx-TAP	
		4" - 18"		✓	✓			FS323-xxx-TAP	
		20" - 30"		✓	✓			FS333-xxx-TAP	

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Category			Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Jack and Bore Devices	Casing Spacers	Metallic		✓	✓	✓	BWM Company	Model BWM-SS-8	**Metallic Casing Spacers:** Bolts, nuts, and washers shall be 316 SS Shell/band shall be min. 14 gauge 304 SS Risers shall be min. 10 gauge 304 SS Each shell section shall have a hardness of Durometer "A" 85-90 and be lined with a min. thickness of 0.090" of ribbed PVC extrusion, EPDM, glass reinforced polymer, or ultra high molecular weight polyethylene.
				✓	✓	✓		Model BWM-SS-12	
				✓	✓	✓	Advanced Products & Systems, Inc.	Model SSI8	
				✓	✓	✓		Model SSI12	
				✓	✓	✓	CCI Pipeline Systems	Model CSS-8	
				✓	✓	✓		Model CSS-12	
				✓	✓	✓	Cascade Waterworks	Series CCS 8"	
				✓	✓	✓		Series CCS 12"	
		Non-Metallic		✓	✓	✓	RACI Products	-	**Non-Metallic Casing Spacers:** Shall be constructed of non-metallic virgin polypropylene or HDPE Shall be sized/spaced per manufacturer's recommendations
				✓	✓	✓	GPT Industries	Ranger II	
	End Seals			✓	✓	✓	BWM Company	Model BWM-PO	Shell/band shall be min. 14 gauge 304 SS For buried installations: T-bolts, bolts, tie rods, nuts, and washers shall be High Strength, Low Alloy Steel conforming to AWWA C111/ANSI A21.11-17 or ASTM A242. Hardware referenced above shall be coated with a blue fluoropolymer coating (Xylan 1424, FluoroKote #1, or AFT-PTFE-Blue). Alternatively, hardware shall be 316 SS.
				✓	✓	✓		Model BWM-WR	
				✓	✓	✓	Advanced Products & Systems, Inc.	Model AC	
				✓	✓	✓		Model AM	
				✓	✓	✓		Model AZ	
				✓	✓	✓		Model AW	
				✓	✓	✓	CCI Pipeline Systems	Model ESC	
				✓	✓	✓		Model ESW	
				✓	✓	✓	Cascade Waterworks	Model CCES	
				✓	✓	✓	GPT Industries Products	-	

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Category			Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Asset Protection/Locators	Tracer Wire			✓	✓	✓	Proline Safety	Pro-Trace HF-CSS	To be used for open cut installations Solid #10 gauge, high strength, copper clad steel wire (Min. 448 PSI break load) Min. 30-mils polyethylene insulation Color coded blue for water, Pantone Purple 522 C for reclaimed water, or green for sanitary sewer
				✓	✓	✓	Copperhead Industries	1030-HS	
				✓	✓	✓	Proline Safety	Pro-Trace HDD-CSS	To be used for horizontal directional drilling installations Solid #10 gauge, extra high strength, copper clad steel wire (Min. 1,940 PSI break load) Min. 45-mils polyethylene insulation Color coded blue for water, Pantone Purple 522 C for reclaimed water, or green for sanitary sewer
				✓	✓	✓	Copperhead Industries	1045-EHS	
	Tracer Wire Connection			✓	✓	✓	Dryconn	King 6 Blue	-
				✓	✓	✓		Direct Bury Lug Aqua	
	Tracer Wire Boxes	Non-traffic rated		✓	✓	✓	Copperhead Industries	Model LD14*TP	Shaft size shall be min. 2-1/2" I.D. Dia and 15" length ABS plastic rim with CI lid
				✓	✓	✓	Bingham & Taylor	Model P202CNG	
		Traffic-rated		✓	✓	✓	Copperhead Industries	Model RB14*TP	Tracer wire box shall be encased in a 6" concrete square, 6" in depth Shaft size shall be min. 2-1/2" I.D. Dia and 14-1/2" length CI rim and lid Shall have H-20 Load Rating
				✓	✓	✓	Bingham & Taylor	Model P2B202CNGHVY15SPB	
		Grounding Anode		✓	✓	✓	Copperhead Industries	Model ANO-1005	Min. 1 lb magnesium anode shall be installed at all pipe dead ends per Section 02800
	Path Marking Tape	Electronic		✓	✓	✓	3M	Series 7600XR	All underground pipe shall have electronically detectable path marking tape made of polyethylene, minimum 6" wide and 6 mm thick The tape shall have embedded detectable markers spaced every 8 feet along the warning tape The tape shall be color coded blue for water, Pantone Purple 522C for reclaimed water, or green for sanitary sewer Shall be marked "CAUTION _____ LINE BURIED BELOW"
	Polyethylene Encasement Tubing			✓	✓	✓	T. Christy's Enterprises	-	Shall be min. 8 mil thick, low density polyethylene tubing conforming to AWWA C105 Shall be color coded blue for water, purple (Pantone 522 C) for reclaimed water, and green for sewer Refer to Ductile Iron Pipe and Fittings Section 02615 for details
				✓	✓	✓	AA Thread	-	
				✓	✓	✓	Trumbull	-	

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Category		Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Valve Boxes	Valve Boxes and Lid Assembly		✓		✓	Pro Select	Series PSVB 461- 664	Assembly shall be cast iron, screw type boxes & lids Alternatively, HDPE boxes shall be two-piece adjustable, min. 1/4-inch thick wall, w/ cast iron lid Bottom Barrel shall be 5-1/4 inches inside diameter, with a flanged bottom Lids shall have color coded tops with the lettering "WATER" or "SEWER" **Roadways:** Shall use heavy duty, min. 24 lbs cast iron drop-type lid **Reclaimed Water:** Shall have square 9" x 9" lid labeled "Reclaimed Water" Shall be colored Pantone 522C
			✓		✓	Tyler Union	Series 6500/6850/6860	
			✓		✓	East Jordan Company Products	Series 8550	
			✓		✓	Sigma Corp./Russell Pipe Company Products	Series VB261 - VB268	
			✓		✓		Series VB630	
			✓		✓	Star Pipe Products	Series VB-0001/VB-0002	
			✓		✓		Series VB-0005/VB-0006	
				✓			Series VB-0023	
			✓		✓	American Flow Control	Trench Adapter	
	Box Alignment Rings		✓	✓	✓	Boxlok Products	Model 3 & 4	Contractor to contact manufacturer to verify alignment ring model number will properly fit valve make and model
Air Release Valve Enclosure			✓	✓	✓	Allied Moulded Products	-	All enclosures shall comply with Manatee County standard detail for shape and size 22" square by 24" tall fiberglass enclosure with a hasp for a padlock Shall have polyester infused aggregate protective coating color coded per application
Service Lateral Clean Out Lid					✓	US Foundry	USF 7621	Clean out lid shall have the letter "S" engraved and pickholes
Meter Boxes			✓			SIP Industries	6423-WNL	Non-locking, colored blue for water
			✓				6423-WL	Locking, colored blue for water
				✓			6423-RWNL	Non-locking, Pantone 522C purple for reclaimed
				✓			6423-RWL	Locking, Pantone 522C purple for reclaimed
Meter Resetters			✓	✓		Ford Meter Box Co.	VB 42-7W (5/8" X 3/4")	Shall meet AWWA C800 Meter resetters shall have padlock wing on angle ball valve Riser Height shall be 7 inch
			✓	✓			VB 43-7W (3/4")	
			✓	✓			VB 44-7W (1")	
			✓	✓		A.Y. McDonald	718-207WX (5/8" X 3/4")	
			✓	✓		Mueller Co.	B-24118	
Water Sample Stations			✓			Safety Guard	Model B.O.S.S.	Bacteriological sample station with built in flush system Shall be installed with UV-protected enclosure

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Category			Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Manholes	Precast Polymer Concrete Manholes					✓	US Composite Pipe	-	**<u>Manholes shall be made of precast polymer concrete in the following applications:</u>** • A manhole that has a force main discharging into it and its two (2) downstream manholes in the flow direction •All manholes that are within three (3) manholes upstream of a lift station. Refer to Manatee County Utility Standards for details. • All manholes with three (3) influent pipes in which at least one (1) of the influent pipes is 12" or larger in diameter • All drop manhole applications • All manholes that have turbulent opposing flows as defined in the Manatee County Utility Standards detail US-3 Refer to Polymer Concrete Manholes Specifications Section 02625 for details Shall be furnished with an approved heavy duty composite frame & lid Frame & lid shall have min. (3) 316 SS locking bolts Refer to Frame & Lids section for approved manufacturers
						✓	Armorock	-	
	Precast Concrete Manholes					✓	-	-	Precast manholes shall be installed for all applications <u>except</u> where a polymer concrete manhole is required as identified in the Precast Polymer Concrete Manholes section Refer to Precast Concrete Structures Specifications Section 03410 for details Only premade O-ring gaskets shall be allowed for joint connection Ramnek or similar products shall not be an acceptable method of joint connection
	Flexible Pipe Connectors	Cast-In Boot (New Construction Only)				✓	A-Lok Products	Z-Lok	Must meet ASTM C923 **<u>Contractor shall grout the annular space between the pipe and wall penetration per manufacturer's recommendations with the following:</u>** <u>Polymer Concrete Manholes:</u> Sauereisen 165/Sikadur 42 Epoxy/ArmorRock Grout <u>Precast Concrete Manholes:</u> Avanti Multi-Grout AV-202/AV-118 **<u>Cast-In Boot:</u>** Shall have external take down clamp and hardware made of 316 SS **<u>Jack-In Boot:</u>** Shall have external take down clamp and hardware made of 316 SS Shall have internal expansion band and hardware made of min. 304 SS
						✓	Trelleborg	Series 706	
						✓	Press-Seal Corp.	Cast-A-Seal Series	
		Jack-In Boot (Existing Construction Only)				✓	Trelleborg	Kor-N-Seal Series 106/206/406	
						✓	Press-Seal Corp.	PSX Direct Drive	
						✓	Hamilton Kent	Tylox MIB Series	
	Rainwater Inserts					✓	SSI Sealing Systems	304 SS	Rainwater insert shall be min. 18 gauge 304 SS
						✓	Rowland	InflowShield	

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Category				Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Manholes	Frame & Lids	Standard					✓	U.S. Foundry	USF 170-CE-1	Must have "MANATEE COUNTY", "SANITARY SEWER", AND "YEAR" CASTED
		Rim Elevation below Floodplain					✓	U.S. Foundry	USF 170-CE-BWT	Shall be used for manholes with lids that are located at less than the flood plain elevations as specified in Utilities Standard Manual 1.12.13 Shall have gasketed seals Shall have min. three (3) 316 SS locking bolts
							✓	Pamrex	Pamtight	
		ARV Manholes with < 44" From Top of Pipe to Cover			✓	✓	✓	Pamrex	Pamrex 32"	Shall be used for ARV hinged manholes with less than 44" from top of pipe to cover In roadways, the lid shall open in the direction opposite of incoming traffic
					✓	✓	✓	U.S. Foundry	USF 324-UT-LOC	
		Heavy Duty Composite					✓	Composite Access Products	CAP ONE	<u>Heavy duty composite frame and lids shall be used with all precast polymer concrete manholes</u> Must have "MANATEE COUNTY", "SANITARY SEWER", AND "YEAR" formed/molded Shall have min. three (3) 316 SS locking bolts
							✓	Trumbull	Model 367	
							✓	Aquatechnology Group	ATG-2400	
	Grade Adjustment Ring Adhesives						✓	Henry	Ram-Nek RN101	Butyl rubber sealant strips shall be used to seal grade adjustment rings to manhole cone Min. 3" wide x 1/2" thick
							✓	Martin Asphalt	Evergrip 990	
	Drop Bowl						✓	Reliner/Duran Products	-	If required, shall be installed per Manatee County Standard Details
	External Joint Wrap		Heat Shrink-Wrap				✓	GPT Industries	Riser-Wrap	**<u>To be used on Bell and Spigot or Tongue and Groove Smooth Wall Manhole Joints:</u>** A min. of eighteen (18) inches wide heat shrinkable joint wrap shall be centered over all new manhole joints including chimney to manhole frame section
							✓	CCI Pipeline Systems	WrapidSeal	
			Non-Shrink Wrap				✓	GPT Industries	Boa-Tape	**<u>To be used on all Tongue and Groove Smooth Wall Manhole Joints:</u>** A min. of twelve (12) inches wide elastomeric plastic joint wrap shall be centered over all new and existing manhole joints including chimney to manhole frame section
							✓	Henry	Rubr-Nek RU116	
	Polymer Grout						✓	Armorock	ArmorRock Grout	Non-shrink, polymer grout shall be used for grouting applications in precast polymer concrete manholes including wall penetrations and adjusting benches
							✓	Sauereisen	No. 165	
							✓	Sikadur	No. 42	
	Grout						✓	Avanti	Multi-Grout AV-202/AV-118	Shall be used for grouting applications in precast concrete manholes including wall penetrations and adjusting benches
	Internal Joint Sealants		Bell and Spigot Manhole Joints				✓	Henry	Ram-Nek RN101	Butyl rubber sealant strips shall be applied to the interior of bell and spigot manhole joints per manufacturer's recommendations Min. 3" wide x 1/2" thick
							✓	Martin Asphalt	Evergrip 990	
							✓	ConSeal	CS102	
			Tongue and Groove Smooth Wall Manhole Joints				✓	Chemlink	M-1	A bead of sealant shall be applied to the interior of tongue and groove smooth wall manhole joints per manufacturer's recommendations Min. 3/4" wide x 1/2" thick
							✓	Adeka	UltraSeal P-201	
	Protective Liners (Rehabilitation)						✓	Raven Lining Systems	Raven 405	Liners shall only be used with written approval from Manatee County to rehabilitate existing manhole concrete surfaces Liners shall be installed per manufacturer's recommendations
							✓	GML Coatings	Green Monster	

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Category				Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Lift Stations	Electrical	Site Lighting					✓	Regent	Model EQ300M1	Min. 6000 lumens LED
		Level Switches and Sensors					✓	MDI Products	-	Float switch
							✓	Connery Manufacturing	-	Float switch
							✓	Dylix	Model GXS3-PP300-A49-B49-50-C01-D49	Pressure transmitter mounted inside a stilling well acting as the primary level sensor For pump stations that re-pump sewage flows from other pump stations
		Flow Meters					✓	McCrometer	Ultra Mag Model UM06	Shall be used for lift stations that re-pump sewage flows (directly or indirectly) from other lift stations
	Mechanical	Submersible Pumps	Satellite				✓	ABS	-	Refer to Lift Station Section 13100 for details Pumps shall have oil-filled cooling system
							✓	Barnes	-	
							✓	Crane	Sithe Series	
							✓	Hydromatic	-	
			Master				✓	Hydromatic		
							✓	Flygt	-	
		Diesel Backup Pumps	Pumps				✓	Godwin Pumps	-	Refer to Diesel Backup Pump Section 11215 for details
			Cooling System Fluid				✓	Prestone Products	-	-
							✓	Zerex Products	-	
			Protective Coating				✓	Carboline	Bitumastic 300M	Pump/Engine enclosures shall have a coal tar epoxy coating, min. 16 mils DFT, for all metal surfaces coming in contact with concrete or grout
							✓	Tnemec	46H-413	Alternatively, a 1/32-inch neoprene gasket between any metal surface and the concrete or masonry shall be used. Gasket shall be installed along the entire perimeter of the metallic surface, not just the fastening hardware.
							✓	Sherwin Williams	SherGlass FF	Fuel tank/skid base shall have haze grey, two coats of 12-15 mils on top of a stripe coat over all welds, crevices, edges and sharp angles

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Category			Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Lift Stations	Structural	Lift Station Wetwell				✓	US Composite Pipe	-	All lift station wetwells shall be made of precast polymer concrete per Manatee County Specifications Section 02625
						✓	Armorock	-	
		Drop Bowl				✓	Reliner/Duran Products	-	If required, shall be installed per Manatee County Standard Details
		Wall Penetration Seals				✓	GPT Industries	Link-Seal Model S-316	All hardware to be 316 SS
						✓	CCI Pipeline Systems	Wrap-IT Link WL-SS Series	
						✓	Proco Products	PenSeal ES Series (Standard)	
		Horizontal Support Channels (For Control Panels Only)				✓	Unistrut Products	-	Min. 1-5/8", 12 gauge solid min. 304 SS channels, attached with 3/8" min. 304 SS all thread rod with min. 304 SS flat washers and nuts Refer to Manatee County standard details
						✓	BLine Products	-	
		Pump Mounting Systems				✓	Barney's Pumps	-	All systems shall be of the front loading slide rail type BPIU All rail and mounting hardware shall be 316 SS
		Lift Station Towers				✓	Rohn	Series RG-45	For heights above > 20'
		Aluminum Access Covers				✓	U.S. Foundry Products	-	Shall be aluminum have min. load rating of 300 PSF All hardware, hinges, and locking hasp shall be 316 SS Covers shall be equipped with a locking staple or bar for use with a padlock Shall have 2 coats of bitumastic epoxy, 16 mils DFT **<u>For Duplex Stations:</u>** 4" Base Elbow Wetwell: hatch shall be minimum 36” x 48” 6" Base Elbow Wetwell (8' Dia. Wetwell): hatch shall be minimum 42” x 60”
						✓	Bilco Products	-	
						✓	Halliday Products	-	

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Category				Submittal	Potable Water	Reclaimed Water	Wastewater	Manufacturer	Model Number	Notes
Lift Stations	Surface Protection	Protective Insert Liners					✓	GU Florida	FRP GU Liner	Liners shall only be used with written approval from Manatee County Liners shall be installed per manufacturer's recommendations Sealant, adhesive, and bonding agent products shall be compatible with liner material FRP liners shall be fabricated with premium grade isophthalic polyester resin, fiberglass chopped strand, woven roving and continuous reinforcements Sand filler shall not be permitted in the FRP laminate
							✓	AGRU	HDPE Sure Grip Liner	
		Protective Liners (Rehabilitation)					✓	Raven Lining Systems	Raven 405	Liners shall only be used with written approval from Manatee County to rehabilitate existing lift station concrete surfaces Liners shall be installed per manufacturer's recommendations
							✓	GML Coatings	Green Monster	
							✓	CCI Spectrum	SpectraShield	
							✓	Sauereisen Products	210T & 210GL (MC Light Brown Formula)	
		Polymer Grout					✓	Armorock	ArmorRock Grout	Non-shrink, polymer grout shall be used for grouting applications in polymer concrete lift stations including wall penetrations
							✓	Sauereisen	No. 165	
							✓	Sikadur	No. 42	
		Grout Applications					✓	Avanti	Multi-Grout AV-202/AV-118	Shall be used for grouting applications in precast concrete lift stations including wall penetrations
		Coating	Valve Vault Interior				✓	Tnemec	Series 69 Hi-Build Epoxy Coating	Interior surfaces of existing vaults shall have two (2) coats of min. 8 mils DFT each
			Exposed Concrete				✓	FLR Paints, Inc.	H&C Silicone Acrylic Concrete Stain, Patio Green	Exterior surfaces of valve vaults, wetwells, and valve assembly pads exposed above grade shall have at least two (2) coats of min. 8 mils DFT each
			Exposed Valve Assembly				✓	Rustoleum	Series 7538/Pro Series 7738	Aboveground valve assembly & piping shall be painted Hunter Green
	Internal Joint Sealants		Bell and Spigot Wetwell Joints				✓	Henry	Ram-Nek RN101	Butyl rubber sealant strips shall be applied to the interior of bell and spigot wetwell joints per manufacturer's recommendations Min. 3" wide x 1/2" thick
							✓	Martin Asphalt	Evergrip 990	
							✓	ConSeal	CS102	
			Tongue and Groove Smooth Wall Wetwell Joints				✓	Chemlink	M-1	A bead of sealant shall be applied to the interior of tongue and groove smooth wall wetwell joints per manufacturer's recommendations Min. 3/4" wide x 1/2" thick
							✓	Adeka	UltraSeal P-201	

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